The Journal
OF THE
Royal United Service Institution.

VOL. XXXVII. JUNE, 1893 No. 184.

[*Authors alone are responsible for the contents of their respective Papers.*]

MILITARY ESSAY, No. 7.*

(HONOURABLY MENTIONED.)

THE MILITARY ORGANIZATION BEST ADAPTED TO IMPERIAL NEEDS.

By Major H. W. PEARSE, East Surrey Regiment.

"Changes will come, but the clock will not work backwards."

I. INTRODUCTORY REMARKS.

IT is impossible to solve the problem set before us without giving some consideration to the question of Britannic confederation, or "Imperial federation," to use the term in common use; and this is the case because our military position depends on the various portions of the Empire remaining linked together at least as closely and firmly as they are to-day.

The falling away of any colony or the cession of any post would affect us adversely, while the development of what may be called an Imperial system of mutual assistance and support between all portions of our possessions and dependencies would add enormously to our strength.

It appears to be the most practical course to deal in the first place, and at length, with matters as they now are; and to defer to final consideration the question of how far the various forces of the Crown can be brought to render assistance one to the other.

Let us consider then what the Imperial needs are to which our

* *Note by Editor.*—The Essays (Nos. 4, 7, and 11) recommended by the referees as deserving of honourable mention will be published in successive issues of the Journal in the order in which they were received for adjudication.

military organization has to be adapted, and which of these needs are satisfied by the existing system.

In a few words, the task of the army and navy is—

a. To defend the United Kingdom from invasion.
b. To defend India and the colonies and dependencies.
c. To protect our trade and supplies.

This task is only made possible by the superiority of our navy in all parts of the world, and that superiority rests on two things, preponderance of strength and the possession of nearly all the coaling stations.

The task of the army follows on the above premises. It is, in brief, to perform that which the navy cannot do, and to set the navy free to perform its own work.

It has then (1) to garrison the selected defensive positions in the United Kingdom, in India, and in the colonies; (2) to undertake such offensive action as may best serve us at home and abroad; and (3) to hold the coaling stations and other naval bases in time of war, so that the whole strength of the navy may be available for active use.

It is admitted that the only effective defence consists of attack; and that attack, to succeed, should be sudden and opportune: our army then should be so organized that on the occurrence of war a force of adequate strength should be immediately available for action in the most effective spot, and no time should be lost through having to take precautions for defence; in a word, we should secure the inestimable advantage afforded by the power of striking the first blow, which can only be obtained in our case by a navy set free from the task of defending the country from invasion. Where this blow is to be struck must of course depend on which nation, or nations, proves to be our enemy, but in any case our necessity is clear and the course of preparation must be much the same.

All our home forces must be restored to immediate efficiency, without being deprived of the power of expansion; faults in our system, when detected, must be corrected; where recruiting languishes or fails, energy and system must restore its efficacy; barrack-square and tactical training must progress; our armament and equipment must keep abreast with those of the foremost Continental armies; and finally our arrangements for mobilization must not only be complete to the last detail, but must be clearly understood, as far as regards themselves, by every man in the forces.

This last point has hitherto been much neglected, but has been for the first time seriously approached by the regulations issued with the Special Army Order dated August 10, 1892. These regulations allot all the Regular troops in the United Kingdom to their places and duties, constituting them into three army corps with four brigades of cavalry.

The remaining regular troops—few in number—are either allotted to garrisons or held in reserve; but the employment of the Militia, Yeomanry, and Volunteers is practically left unconsidered, five brigades of Militia alone being included in the 3rd Army Corps.

It is now proposed to consider the different armies which serve the British Empire, with a special regard to suggesting improvements in general and detailed organization.

II. The Regular Army.

The Cavalry.

The cavalry had on January 1, 1892, the following effective strength of all ranks—

Household Cavalry		1,298
Cavalry of the line—at home	11,461	
Abroad	6,636	
		18,097
Total		19,395

In rank and file the Household Cavalry was exactly up to its establishment, while the cavalry of the line had 410 supernumeraries.

All the cavalry abroad was in India, except 190 (one squadron) in Egypt and 497 (one regiment) in South Africa.

The three regiments of Household Cavalry are of course in England, as are ten regiments and six troops of line cavalry; one regiment is in Scotland and six are in Ireland.

Abroad there are nine regiments in India and one in Natal, while one squadron is in Egypt; the depôts of the ten regiments abroad are at Canterbury.

The reserve of the cavalry of the line numbered 4,677 men, of whom only 97 were over 35 years old; all the remainder being between 25 and 35.

There being twenty-eight regiments, each may be said to have an available reserve of 150 men; and, although it would not be judicious to introduce simultaneously so large a number of men who have somewhat lost the habit of discipline into a regiment with many young non-commissioned officers, it is indubitably an advantage to have a strong reserve of soldiers who have received a thorough training at no very remote period.

It is asserted that most cavalry Reservists are employed in connection with horses, and that they, therefore, do not lose the custom of riding and horse-management; in discipline, however, they certainly must deteriorate, and the fact that they would be older than most of the non-commissioned officers under whom they would be called upon to serve must count against their desirability when recalled to their regiments.

Cavalry regiments at home are very young; out of the 10,964 non-commissioned officers and men serving at home on January 1, 1892, there were 3,713 under 21 years of age.

Considering the length of training which is considered necessary for the cavalry soldier, it must, I think, be admitted that it is desirable that the average age should be raised.

No attempt has been made to ascertain the condition of cavalry

Reservists as regards employment in civil life, but it is believed that men of good character find it comparatively more easy to obtain work than do infantry soldiers.

Owing, however, to the financial depression which has existed throughout the country during recent years, it is within my knowledge that a large number of really good civilian coachmen and grooms are thrown out of employment; and I think it fair to assume that this state of affairs has acted unfavourably as regards cavalry Reservists who naturally seek this class of employment.

Recommendations.

I believe then that it would be advisable to allow men of good character to return to their regiments who have been not less than six months in the Reserve and have failed to obtain employment.

These men would return with a fixed belief that their best chance of success in life lay in the army, and would, I believe, be far more valuable to the country than if forcibly retained in the Reserve, where their existence would be a burden to themselves and a standing scarecrow against recruiting.

I do not believe that too large a proportion of the Reserve would take advantage of this permission, and the balance could be restored by allowing thoroughly trained men to pass to the Reserve after four years' regimental service, on their friends giving satisfactory assurance of civil employment for them.

I believe that a sufficient proportion of the returned Reservists would volunteer for service in India, to overcome the difficulty which now exists of obtaining the necessary drafts for regiments in that country.

Lastly, having regard to the numerical weakness of our cavalry, and the fact that the average mounted soldier retains his efficiency longer than the infantry soldier, I would recommend that all men of good character should be allowed to serve on for pension.

The cavalry service is a popular one, and would, no doubt, become even more so if the principle were admitted of allowing men (within reasonable bounds) to join the Reserve and to rejoin the colours at their own will.

Much has been done lately to improve the condition of all branches of the army, and, with a more comfortable system of barrack life and less compulsory deductions from the moderate pay of the soldier, I believe a very high standard, both as to physique and character, could be exacted from cavalry recruits.

An increased percentage of non-commissioned officers and men serving on for pension would aid this (1) by causing a less number of recruits to be required annually, and (2) by making regiments comfortable homes, as regiments alone can be that are in a thoroughly efficient state.

With such a force of cavalry, weak as it would still be in numbers, much could be done; and some diminution in the strength of the Reserve could be regarded with equanimity.

The training of cavalry is too large a matter to be dealt with com-

prehensively here, but the experience afforded by the manœuvres of recent years has shown the grounds on which it should be conducted. Concentration, if only for a time, is an absolute necessity, more necessary probably for cavalry than for the other arms. The abolition of such stations as Brighton, where a cavalry regiment is thrown away and must stagnate, is a most desirable reform.

Our cavalry regiments abroad do not suffer in this way, and may be considered to be as near perfection as possible; their number can only be considered sufficient on account of the extreme difficulty of providing for their wants in active service beyond our Indian frontiers—the only place where serious work is likely to be cut out for them.

Finally I would strongly urge that the privilege of furlough from foreign stations should be extended to a liberal degree in the cavalry service, believing that that measure, more than any other, would attract a superior class of recruit, and help to obtain a sufficient supply of men for India.

The Artillery.

The strength and distribution of the Royal Artillery on the 1st January, 1892, were as follows :—

At home	17,663
In the colonies and on passage	5,143
In India	12,876
Total of all ranks	35,682

The rank and file were divided as follows between the different branches :—

Royal Horse Artillery	3,413	or	109	above	establishment.
Field Artillery	12,848	„	256	„	„
Mountain Artillery	1,142	„	4	under	„
Garrison „	14,210	„	469	„	„

There is no difficulty in obtaining a sufficient supply of satisfactory recruits; the smart uniform of the horse and field batteries and the improved pay and other advantages of the garrison service proving attractive to the enlisting classes.

The number of service batteries is as follows :—

Royal Horse Artillery	At home,	9	In India,	11	Total,	20
Field Artillery	„	38	„	42	„	80
Mountain Artillery	Home,	1	Colonies,	1	India,	8	„ 10

There are 68 service companies of Garrison Artillery, of which 22 are at home, 19 in Egypt, in the colonies, and on passage, and 27 are in India.

The number of guns actually available for field service at home and abroad is as follows :—

Royal Horse Artillery ...	112 guns	Total, 624.
Field Artillery	452 „	
Mountain Artillery	60 „	

The question whether this number should or should not be increased is a very difficult one to decide, both sides being strongly supported. To come to a decision the following points must be weighed:—

1. Any army employed by us for offence or defence must be proportionately as strong in artillery as the force which it would have to meet.

2. It being essential that our army should not be dangerously weak in any arm, an undue proportion of the available money must not be expended on one arm to the detriment of any other.

3. The strength of cavalry and artillery desirable in an army must depend on the nature of the country in which it is likely to be employed.

With regard to the first point, I believe that we have sufficient artillery at home to deal with any force that could be suddenly thrown into the United Kingdom, or for any expeditionary force which we could send to operate on the Continent.

As to the second point, having regard to the great expense of the artillery, I believe that more money could not be judiciously expended on that arm without detriment to the cavalry or infantry, or without an increase to the Army Estimates.

As to the third point, the most likely scene of operations on a large scale in which our artillery would be employed is Afghanistan, and I hold that our strength of artillery in India is equal to any demands likely to be made during the first year of the struggle with Russia; regard being had to the fact that the resources of Afghanistan limit the strength of the mounted branches of an army employed there. That war once begun, constant reinforcements of all arms would have to be poured into India, but I believe that our artillery would be sufficient when placed on a war footing.

Recommendations.

a. The subject of artillery organization is an extremely difficult one, and I believe that no sweeping change can be carried out without most careful consideration and preparation.

That the mounted and dismounted services should be completely separated appears to me to be an undoubted fact, but this could not be done all at once. Young officers should be called upon to make an early choice of their branch, and, the choice once made, should not be allowed to exchange unless for the good of the service as well as for their own convenience.

b. I recommend the continuance of the Horse Artillery as a *corps d'élite*, but think that all its recruits should, as a rule, enlist straight into it, and that the system of selecting men from field batteries should be discontinued, as being injurious and unnecessary. At the same time genuine volunteering into the Horse Artillery should be permitted to desirable men of good character.

c. Recruits in all branches should receive their training with the depôt batteries; the training to be completed on their joining their service batteries. The present system of taking drafts from service batteries at home to complete those abroad is most injurious. It is based on the infantry system, which is so bad that it seems incredible that other arms should copy it save from motives of economy. An increase of establishment in the depôts would be necessary, but the outlay would not be heavy, and the increase of efficiency in home service batteries would well repay it. Recruits do not require a very long training before joining their batteries; it is with them that they receive the most practical part of their military education.

Nothing that has been written deprecating an undue expenditure on our artillery must be taken as being aimed against outlay on re-armament. The artillery depends more for its efficiency on the advance of science than do the other arms, and it would be mere folly on the part of the richest of nations to allow its army to fight at a disadvantage as regards armament. In artillery we must be at least abreast in this respect with the foremost Continental army, and any force employed by us must be as strong in that arm as the enemy it is intended to meet.

The Infantry.

The most important of the subdivisions of the problem before us is to decide on the best organization for our regular infantry.

An army stands or falls by the quality of its infantry.

With inferior cavalry or artillery, or both, it may prove the conqueror by the superiority of its infantry, but the converse is impossible.

A brief glance at the history of our present system is necessary.

The modern British army—that is, the army which has fought against civilized Continental armies in the days of rapid and scientific campaigns—owes its formation to the Duke of Wellington.

Out of the worst materials he created the army which checked the career of Napoleon and eventually saved Europe. Wellington's army was invincible, for no unit of it dared to fail in its duty. Regiment competed with regiment, brigade with brigade, and division with division. Year after year throughout that gigantic struggle it remained unchanged in the constitution of its units, save by the wasting of battle and disease; the master-hand controlled it, and the nation in arms formed its reserve.

After Waterloo long years of peace followed, broken by Indian and African wars alone; and the army under Wellington and his pupils remained unchanged in system, though diminished in numbers.

Then came the fierce trial of the war with Russia, and the small long-service army won our battles, but having no ready-trained reserve, and being wasted by battle and sickness, fell into great straits.

The Indian Mutiny quickly followed with like results.

Finally, the war between France and Germany dealt the last blow to long service, and our reformers (ever prone in military matters to copy other nations rather than strike out a line of their own) decided

that the only safety lay in imitating the territorial system of the conquering nation.

Before reforming, however, they found it necessary to destroy, and for the last twenty-two years incessant changes—always well meant, no doubt, but often vague and mischievous—have undone the work of Wellington and replaced it by a patchwork creation, devised by theorists and carried out by a succession of agents, one often working against the designs of his predecessor.

What have we now?

On January 1, 1892, the effective strength of the infantry (all ranks) was as follows:—

Foot Guards, 5,685; with a Reserve of 4,216.

Of those serving with the colours, 1,801 were under 21 years old. Six battalions were stationed in England and one in Ireland.

The Foot Guards may be dismissed in a few lines.

The condition of the brigade is in every way satisfactory, except that the men and a part of the non-commissioned officers are too young. The men, being principally quartered in London, are peculiarly exposed to the machinations of agitators, and have unfortunately not always been proof against them.

The remedy is to be found by giving increased inducements in the shape of higher pay to non-commissioned officers to extend their service; the expense would be inconsiderable, as the number is so limited.

It also seems desirable that four years and not three should be the minimum period of colour service. A slight reduction in the strength of the Reserve would be more than counterbalanced by the improvement to the brigade, and in my belief no difficulty in recruiting would follow.

The Reserve of the Guards is untrained, like that of the other branches, and this matter will be discussed under the separate heading of the "Army Reserve."

The Infantry of the Line.

Total Strength.....	133,088,	with a Reserve of 47,075.[1]
Distribution.... At home	56,487	(of whom 28,396 under 21 years of age).
In India	52,348	
In Egypt and the colonies	24,253	(including troops on passage).

In theory half the 141 Line battalions—say 71—should be at home and 70 in India and the colonies, but actually the present division is 65 at home and 76 abroad.

This destroys the whole working of the double-battalion system, which, even if exactly carried out, has many drawbacks. Without entering into too great detail or argument, I will present the leading advantages and disadvantages of the system.

[1] The "Militia Reserve" is discussed under the head of "Militia."

Advantages.

1st. Economy in providing drafts for battalions abroad.

2nd. Greater certainty of keeping battalions abroad up to their strength than if they depended on their depôts for recruits.

3rd. Economy, by the system of battalions on going abroad and coming home exchanging a large proportion of their strength without payment of bounty.

4th. Increased facilities for the exchanges of officers, and to a certain extent of non-commissioned officers.

Disadvantages.

1st. Restlessness and a feeling of insecurity in the non-commissioned officers and men, who are aware that they are liable to transfer.

2nd. Consequent difficulty in recruiting.

3rd. Inefficiency of all battalions at home for any active service, they being mere training depôts for battalions abroad, and having all the youngest and most immature men in their ranks.

This summary puts the case fairly, and in my opinion the deduction is that the system, even if given a fair chance, would be a failure, and, as far as can be seen, it never will be given a fair chance by the thorough carrying out of its provisions.

What the system gives us is (*a*) at home a confessedly inefficient infantry, which, in the event of war, is to be largely replaced by an untrained reserve; (*b*) abroad, an efficient force, even a fine force in the greater part, but showing a great falling off in stamina and efficiency in those units which have been less than three years abroad, a not unimportant proportion of the whole force.

The Territorial System.

After ten years' working it cannot be said that the territorial system has made any general impression on the constitution of our infantry regiments, and in many cases it is impossible that it should do so. No attempt has been made to localize the other arms. Owing to the exigencies of service abroad and in Ireland, infantry regiments cannot be stationed for any length of time in the districts to which they are supposed to belong; but the greatest stumbling-block in the way of this system is presented by the localities from which our recruits are drawn. Thus, Scotland, with 19 battalions apportioned to her, only furnished 2,684 recruits in 1891, and these for all arms of the Service; Ireland, with 16 battalions, furnished 1,789 recruits only, also for all arms. It is therefore evident that even allowing for Scotchmen and Irishmen enlisted in England applying to be posted to their national regiments, the said Scotch and Irish regiments are not territorial regiments at all.

This is also the case with many English regiments; for instance (1.) The Carlisle District in 1891 gave 59 recruits to the Border Regiment of 2 battalions. (2.) Beverley gave 65 for the 2 battalions of the East Yorkshire Regiment. (3.) Bodmin gave 69 for the 2 battalions of the Cornwall Light Infantry. None of these regiments can

be called territorial, and the connection of many others with their districts is but little more real.

I freely admit that if a real and genuine territorial system could exist it would be most valuable, possibly even worth the great price paid—the sacrifice of the old regimental system. But, as has been shown, this is impossible. The chief gain to the line infantry has been attained by the close association of the Militia with it, which has resulted in a large and steady flow of recruits from the Militia. But it is very doubtful if this depends on the territorial designation of regiments, and if good for the Line it is bad for the Militia.

The Reserve.

Before specifying my recommendations for the infantry, a few lines must be devoted to the Reserve.

We have seen that the Foot Guards have a reserve of over 4,000 men, and the line infantry of over 47,000.

This is a very important force, and one on which more money might advantageously be spent, with two objects, viz., to make it more efficient, and to eliminate from it the present large proportion of unemployed and discontented men who form so great a hindrance to recruiting.

Full inquiries into the condition of the infantry Reserve was made by Lord Wantage's Committee, and from the statement of the men themselves it was found that 544 men, or one-sixth of the Guards' Reserve, who were questioned, and 8,511, or one-fourth of the line infantry Reserve questioned, were not in regular employment.

The whole Reserve is left totally untrained from the day the men leave the colours; and, seeing that all leading authorities have in various languages told us that the efficiency of an army depends on drill, discipline, and shooting, what are we to expect from a system which relies in great part for the safety of the country on a Reserve the members of which have been undisciplined, undrilled, and unpractised in shooting for periods running up to nine years in the case of the Guards, and five years in the case of the line?

Recommendations.

With the object of forming an efficient home infantry, of maintaining the excellence of the battalions abroad, and of substituting a smaller but contented and trained Reserve for that which we now have, I make the following recommendations:—

1. That recruits for battalions abroad should be trained at the depôts, and those for battalions at home with their battalions.

2. That non-commissioned officers and men at home should have the option of volunteering to join the foreign battalion, if not less than twenty-one years of age and willing to serve not less than four years with the colours abroad.

3. That non-commissioned officers and men who have served four years abroad should be permitted to volunteer to the home battalions if willing to serve (after a furlough) four years with the colours at home.

4. That if possible every man, when fully trained and disciplined, *i.e.*, after four years' service, should have the right to join the Reserve.

5.[1] That every man should have the right to rejoin the colours for a second period of four years, if after six months in the Reserve he is unable to obtain settled employment and is of opinion that army service is better suited to him than civil life. Every man of "exemplary" character to have the right of serving on for pension.

6. That money inducements should be offered to Reservists to perform a modicum of drill and musketry annually.

Owing to the comparatively long colour training received by the men they might be left for one year, to enable them to settle down thoroughly in their employment.

Great latitude should then be given them as to the manner in which they would perform their training.

I would suggest that the sum of 1*l.* annual bounty for nine drills and 1*l.* for a higher scale of musketry, 10*s.* for a lower scale, would induce a large proportion of the men to undergo a training.

The simplest method would be for the Reservists to be affiliated to the nearest Volunteer battalion to their place of residence, a certificate of efficiency from the adjutant being accepted as a voucher by the paymaster from whom they receive their Reserve pay.

Those who might find this inconvenient could perform their drills and musketry at any military station where a rifle range exists.

Reservists who volunteered to join Militia battalions as supernumeraries should receive a higher annual bounty.

7. That the identity and historical reputation of regiments should be revived by the restoration of numbers.

The linking of regiments into pairs, the formation, in fact, of double battalion regiments, is an accomplished thing, and cannot be undone. Indeed, the linking has advantages, as has already been shown. But I can see no reason why those units which are now called the 1st and 2nd Battalions of such and such a territorial regiment should not be called once more by their old numbers.

The hopeless confusion caused by the similarity of many of the territorial names is undeniable; indeed, I am not aware of any official who has been found capable of clearly distinguishing off-hand between the various Yorkshire regiments. Official despatches are popularly believed to have assigned special distinction to one regiment in mistake for another of somewhat similar name.

What staff officer on active service (and, after all, it is for active service that our army is organized) would hesitate if allowed to choose between calling a regiment the "51st Light Infantry" or the "1st Battalion the King's Own (Yorkshire Light Infantry)"? What possibilities, indeed, probabilities, of confusion does not the latter

[1] This recommendation would, at present, only be taken advantage of by less than a quarter of the infantry Reserve, and if a public pledge were given by Government that the Reserve should never be called out save for a serious war, Reserve men would more readily find employment, and probably but few men would hereafter find it necessary to rejoin the colours.

name suggest with the various "King's Own," or "King's," or "Yorkshire" regiments "East," "West," and "Yorkshire" pure and simple!

8. If my first recommendation were carried out, recruits would have to be kept from eighteen months to two years at the depôts, and consequently more accommodation would be required for them, and less would be available for drilling Militia recruits. This could be met by a return to the system of training Militia recruits in camp, before the assembly of their regiments, which I believe to be better than drilling them at the depôts. The present expensive plan of permanently employing Militia officers at the depôts could also be discontinued.

III. The Yeomanry, Militia, and Volunteers.

The Yeomanry.

The Yeomanry is a small but very important force, for in the event of invasion the addition of some 10,000 fairly trained cavalry soldiers, most of them excellent riders, with a minute knowledge of their own part of the country, would form a most valuable reinforcement to our regular cavalry, competent to relieve it at once of all duties save the most onerous and important, and, after a short embodiment and the consequent constant practice, probably as valuable for all purposes but one as regular cavalry, the one exception being "shock" tactics, for which nothing but strong and assiduous training prepares a body of men.

The strength of the Yeomanry on January 1, 1892, was 10,768, and the annual cost of the force is shown in the Army Estimates to be 115,280*l.*, or an average cost of 10*l.* 15*s.* 3*d.* per enrolled Yeoman.

It is unfortunately the case that of late years the strength of the Yeomanry has diminished, owing to agricultural depression. Some corps have become so weak that it has recently been proposed to amalgamate them, as far as training is concerned, by reducing the permanent staff.

It is very difficult to decide what is the most desirable course to pursue, but it appears that if the circumstances of a county have become such that it cannot furnish a Yeomanry regiment of adequate strength, and is unlikely to be able to do so in the future, the best plan would be to disband the regiment and devote the money to increasing the allowance of other corps more favourably situated.

This seems to be a hard measure to advocate, but I believe that very weak units of whatever arm are a mistake, and that money can be better applied than in keeping them dragging on an existence under increasing difficulties. The zealous and well-to-do members of disbanded corps would in many cases join the nearest corps.

To retain the distinctive names of small Yeomanry regiments while only allowing them a share of an adjutant and a smaller permanent staff, appears to me only to postpone the necessary cutting of the Gordian knot.

The Militia.

On the dates of the annual inspections of the several regiments in

1891, the total strength of the Militia was 112,201; showing a deficiency of 23,524 from the establishment of 135,725 laid down in Army Orders.

Of this strength, however, 5,466 were absent with leave from training, and 10,159 were absent without leave; and the most favourable view of the matter only authorizes us to consider those absent with leave as part of the available strength of the force.

Taking this favourable view, we may then estimate the Militia at

96,576	present at training.
5,466	absent with leave.
Total 102,042	

This force consisted of artillery, engineers, and infantry, in the following proportions:—

Artillery 14,562, engineers 1,863, infantry 85,617.

The annual increase and decrease of the Militia is very large; the former in 1891 amounting to 43,144; and the latter to 42,932, showing a net increase of 212.

No less than 39,783 recruits were enrolled during the year, and 33,752 of the Militia were under 20 years old.

Finally, the strength of the Militia Reserve on January 1, 1892, was 30,171.

A careful consideration of the above figures leads to some serious deductions.

1. The Militia in many parts of the country—that is, in the agricultural regions—is a decaying force.

This fact has been recognised by the War Office, who have recently reduced the establishment of many country regiments and increased those of town regiments.

The matter is incurable, being caused by the tendency of the day of the labouring classes to leave the country and crowd into cities.

2. The "Militia Reserve," which purports to be a second reserve for the army, cannot be drawn on without the most serious effects on the efficiency of the Militia.

It is not too much to say that a Militia regiment containing 300 recruits, and drained of its "Reserve" (which includes in most cases the most efficient of its non-commissioned officers), would be in no fit state for active service for many months, not in fact until after the probable duration of any serious war in which the country might be involved. This fact has been partially recognised by the authorities, and the "Regulations for Mobilization" state that, on mobilization for home defence, Militia Reservists will not join the Regular forces, but will serve with their Militia units.

Consequently it is only intended to utilize the Militia Reserve in the event of our being driven into war for the defence of India or some of the colonies, or of our undertaking active operations in an enemy's country.

In so serious an event I find it hard to believe that these men, the

flower of the Militia force, would be withdrawn from it, and I would urge that the farce of considering them a reserve for the Regular army should cease.

What they really are is a body of 30,000 men who are paid an annual bounty to induce them to remain in the Militia, and looked at in that light I consider the money well laid out. To consider them as nearly a third (and the best third) of the Militia, and also as a reserve of the Regular army, is painfully suggestive of Bombastes Furioso.

Recommendations.

One of the most pressing needs of the Militia is a levelling-up of the training of different regiments.

Some have the advantage every year of a training at Aldershot, or one of the other standing camps, while many regiments train year after year at their headquarters, and, consequently, never have any tactical training with other troops, nor the advantage of comparing themselves with others and the consequent increased zeal and emulation.

To take a very strong instance, the 3rd Battalion King's Own Scottish Borderers have (I believe) never trained away from their headquarters since,the Crimean War.

1. I recommend then that the artillery and engineers should all train in the large garrisons, such as Portsmouth, Chatham, Dover, &c.; and that as many infantry regiments as possible should train in the standing camps, and that those battalions who cannot be so trained should be formed into Militia brigades, under a first-rate Regular Brigadier, and trained in convenient localities.

If it continues to be the case that all the infantry Militia cannot be accommodated in the standing camps, battalions should be sent to them strictly in rotation; but with the gradual increase of accommodation it is to be hoped that annually fewer battalions will be compelled to train in the detached brigade camps.

2. I, secondly, recommend that in time of war and emergency the Militia should be liable to serve abroad, without any restriction.

The arguments for and against this measure are to be found fully set forth in No. 153 of the Journal of this Institution, and I believe that the measure is in every way desirable, that it would have little effect on recruiting, and would be popular with Militia officers.

Any persons, of whatever rank, who might be deterred by this step from joining the Militia are better out of it.

There are very marked degrees in the efficiency of Militia officers. A large proportion of them are extremely zealous, and endeavour by study and service additional to the prescribed training to master their duties.

I think, however, that Commanding Officers' hands would be strengthened and the standard of efficiency raised, if more action were taken by the authorities in the case of officers who do not fully qualify themselves and show zeal into the bargain. Raising the standard is not found by experience to produce any failure of supply;

on the contrary, in military affairs the more that is demanded the more is cheerfully given.

3. It is to be desired that the duties which the Militia are to perform in the event of mobilization should be published. At present a certain number of battalions have been detailed to form five brigades of the 3rd Army Corps, and one battalion has been detailed as the corps infantry of that organization; but the great bulk of the Militia has been left even more in the dark as to its duties in time of war than have the Volunteers. The wheels of mobilization cannot work freely unless every detail of the system is understood by those concerned.

The Volunteers.

The strength of the Volunteers on November 1, 1891, was 222,046 of all ranks, of whom 214,197 were efficient.

There was a deficiency of 39,168 from the authorized maximum establishment, and in spite of a slight recent increase in the force, it is not likely that this maximum will ever be reached or even approached.

The enrolled strength shows the following numbers "by arms."

Light horse.....	248	of whom	41	non-efficient.
Artillery.....	41,077	„	1,596	„
Engineers	13,161	„	500	„
Mounted rifles	45	„	44	„ (since disbanded).
Infantry.....	166,162	„	5,588	non-efficient.
Medical Staff Corps.	1,353	„	80	„
Totals..	222,046	„	7,849	„

Considering how easy of attainment the standard of efficiency still is, I do not think that the members of the Volunteer force who from ill-health or other causes have been unable to become efficient, add to its effective strength, and consequently I take the Volunteer force to be practically 214,197 strong, and likely to remain at about that strength. The annual sum shown in the Army Estimates as devoted to the personnel (effective and non-effective) of the Volunteers is 1,110,100*l.*; or an average cost of 5*l.* 2*s.* 10*d.* per efficient Volunteer.

This force has now been recognised as an essential part of the defensive force of the country, and has been assigned definite functions. The formation of submarine miners (included above in the engineers) is an important and useful step, as is the organization of the Volunteer Medical Staff and Staff Corps.

The infantry corps existing near the fortresses and harbours to be defended have been detailed as part of their garrisons, and the remainder have been incorporated into brigades, parts of which are now annually trained as such under permanently appointed Brigadiers.

That part of the artillery not required for fortress defence has been organized in position batteries, to which guns and harness have been issued. The equipment has lately been put on a much more satis-

factory footing, and the force may in that respect be said to be prepared for embodiment.

There are, however, serious questions to be considered, deficiencies to be supplied, and doubts to be resolved. The chief difficulties to which the Volunteer force is subject are:—

1. The deficiency of officers.
2. The yearly increasing difficulty in obtaining range accommodation.

Leaving the difficulties and deficiencies to be dealt with by my suggestions, a few words must be said as to the "doubts." The first and greatest of these is, of course, the great doubt which is shared by many as to whether the Volunteers could be relied on as a defence for the country in the event of a protracted war. Would it be possible to embody any large portion of the force, say, for six months?

All Englishmen hope and believe that on the occurrence of a sudden and imminent danger, the Volunteers would come forward for the defence of our coasts and our capital, the great heart of the Empire; but could these Volunteers, very many of them supporters of families, employed in businesses and trades, leave their daily occupations for a lengthened period, and remain in garrisons and camps until the day of danger had passed, or until the army and Militia had been so strengthened and consolidated as to form a sufficient force for defensive and offensive purposes? In my opinion they would not, and for the following reasons:—

a. Experience shows that at Easter, the longest general holiday in the year, only about half the strength of most battalions can go into camp for so short a period as four days.

b. On the breaking out of war, trade would be much hampered, and to judge by what happened in the last great war, large numbers of men thrown out of employment would enlist into the army for the period during which the war might last.

This would take away a large proportion of the younger Volunteers, and many others of the more active and military spirits would probably enlist from love of adventure.

c. This would leave in the force chiefly the fathers of families, small tradesmen, and others, who would be working under great difficulties, and at severe pressure, and would find it totally impossible to serve in a lengthened embodiment of the Volunteer force.

For these reasons I hold that the Volunteers could not give their services to the country for any length of time, even if paid as soldiers on a liberal scale during embodiment. There is, however, still a great need for the force, and the country is indebted to them for an immense boon; that is the comparative security against a sudden dash on our shores which without the protection of the Volunteers would be an imminent danger, so imminent in fact that but for the Volunteers there would be no safety for us save in a large army raised by conscription.

Recommendations.

For the increased efficiency of the Volunteers, and for the further adaptation of the force to the duty which it can perform in the day of need, I make the following recommendations:—

1. The whole force to have its duties on mobilization clearly defined. At present only twenty infantry brigades out of thirty-three have had their places of mobilization appointed, and no information has been given to any unit of the force as to the exact duties that it would be called upon to perform.

2. The questions of an adequate supply of officers, and of rifle ranges, to be immediately dealt with by Parliament. These matters are not party questions, and, if we want to remain a nation, must, with all other questions affecting national safety, be dealt with liberally and decisively.

As regards officers, the War Office can settle that difficulty very easily, by authoritatively forbidding any expense (whether voluntarily undertaken or not) being allowed to fall on officers. I would suggest that Volunteer officers should be provided with complete uniform on joining on signing an agreement to serve not less than four years, to make themselves efficient in drill within a year, to pass the necessary examination at the School of Instruction, or before a Board of Regular officers, within eighteen months, and to pass the examination in tactics within two years.

I believe that a number of young, zealous officers would thus be enabled to join the force, who are now kept out of it purely by the initial outlay and necessary subscriptions. A strong inducement to the right class of men would be the granting of a small number of commissions in the Regular army, but I am aware that care must be taken not to injure the Militia in this respect.

Competition for these commissions would be very keen, and almost any qualification might be exacted from candidates. I believe that this measure would go a long way towards supplying the existing dearth of Volunteer subalterns.

3. The financial state of the various units of the force requires investigation. Large debts would be found to exist in many cases, with no possibility of fixing the responsibility for them on any particular persons.

These debts should be adjusted, and Officers Commanding Royal Artillery and Regimental Districts held strictly responsible for the financial arrangements of the future. The capitation grant should be administered with more elasticity, some corps require much more expenditure than others, from various circumstances.

I believe that the present grant is sufficient for nearly all unfavourably situated corps, and that a saving might be effected by reductions in some cases which would cover the proposed outlay on officers and gradually pay existing debts.

Remarks and Suggestions.

To the British army is entrusted the first and most important of our "Imperial needs," and a considerable portion of the need which ranks second in importance—the first being the defence of the United Kingdom, and the second the defence of India.

Until recent years it has been our boast that the invasion of

England was an impossibility, and this in spite of history showing that on several occasions it has been accomplished, and on many more threatened. Nelson, and other great commanders, gave us the command of the sea, and we have since considered our position impregnable.

It has devolved on Colonel Maurice, an authority on European war, to give this belief a shock; and his words are so weighty that I shall quote nearly in full two passages from "War":—

"It is very difficult to foresee what will happen in the next land war; but there the future is open and certain if it be compared with the utter darkness into which our best sailors have to gaze when they contemplate the circumstances of the next great naval engagement."

The second passage is:—

"The point to which I want to get an answer, for which I have as yet asked in vain, is this: What is to prevent a French Channel Fleet being stored with shells recently filled with fresh-made explosives? Would those shells not, under those circumstances, be good for a week's work? Would any admiral like to meet a fleet armed with them if he had no high-explosive shells himself? Could an English fleet . . . be as easily supplied with fresh-made roborite and fresh-filled shells as a French fleet, which had only to issue direct from ports in which melinite is made, could be stored with shells freshly filled with new melinite?"

Now Colonel Maurice indicates very plainly that in his opinion there is a serious danger, owing to the lead taken by France in the study of high explosives, of our navy having to fight at a disadvantage should war break out between the two countries; and that there is a *possibility* of disaster coming suddenly upon us by the advantage afforded to France by superiority of armament proving so overwhelming as to enable her to clear the Channel, at any rate for a time, and consequently to invade England.

Now we must decide, and that promptly, if our army at home is adequate to the task which would fall upon it, should this possibility be realized, for, with the existence of the nation at stake, possibilities must not be disregarded.

The question is then: Does our present system provide us with a defensive force which could cope at the shortest notice with the army which France (the nearest and most unfriendly Power) could throw into the country if she could secure even for a week the command of the Channel?

If it does not provide us with the required force, what changes would be necessary?

I will not repeat my contention as to the primary importance of infantry, but will state my conviction that the first and most absolutely necessary change has regard to that arm.

My contention is that, important as a Reserve is for the carrying on of a war, our first need is to have efficient regiments at home as well as in India; in fact, that the immediate safeguard of the country should be the army serving with the colours, and not the untrained

and undisciplined Reserve upon which many authorities tell us that we can rely.

A return to long service is not possible, if it were desirable, but Lord Roberts' principle of free trade in the army should be adopted, and men who wish to make soldiering a profession should be allowed to do so, even at the cost of a slightly enlarged pension list, and possibly a diminished Reserve.

Suggested System.

a. Period of colour and reserve service to be as at present for all branches, except that the minimum of colour service should be 4 instead of 3 years.

b. Great freedom to be allowed to thoroughly trained soldiers of good character to serve with the colours or in the Reserve, passing to the Reserve after periods of 4 years with the colours, and returning to the colours after periods of 6 months, or even 1 year in the Reserve. Deferred pay not to be refunded.

c. Regiments abroad (all arms) to be supplied with drafts from the depôts, and men over 21 years old who may volunteer from regiments at home.

d. Pensions to be granted for a total colour service of 21 years (not necessarily continuous).

e. Soldiers of good character to be *permitted* to serve on for pension; non-commissioned officers to be *encouraged* to do so.

f. The present reduction in the number of senior officers to be carried out very cautiously: in the event of war, a large number of General Officers and colonels would be required, and the principle of only promoting in the senior ranks to fill appointments would leave no one available for extraordinary duties.

g. The Militia to be liable to serve anywhere whenever the Reserve is called out. This, with an efficient army, would only be on occasions of national danger.

h. All Volunteers who are non-efficient at the end of the Volunteer year to be struck off the strength.

With regard to the Royal Engineers and the various Departments and small corps I have no suggestions to offer, believing as I do that all the recent changes have been for the better, and that in process of time a thoroughly satisfactory organization will be completed.

In explanation of dismissing so important a service as the Royal Engineers in so few words, I would point out how much that distinguished corps is to be envied by the rest of the army. Its changes of organization are rare, and are carried out quietly and without friction; its varied duties and high pay attract officers and men of high educational qualifications; and, finally, it performs admirably all and any duties which the routine of peace or the chances of war put upon it.

IV. The Army of India.

The table on p. 599 shows the total strength of the Regular army of India to have been 220,300 of all ranks, on 1st April, 1891.

I have been unable to obtain complete figures to a later date than this, but have ascertained from official sources that any changes in the numbers would be very trifling, the principal alteration being the reduction of one cavalry regiment in Madras.

This army of 220,300 men forms the following corps:—

British cavalry	9 regiments.	
„ artillery ...	91 batteries.	
„ infantry ...	53 battalions.	
Native cavalry	42 regiments.	Including Punjab Frontier Force, Hyderabad Contingent, &c., but a few corps of cavalry and infantry of less strength than a regiment or battalion are not included.
„ artillery ...	13 batteries.	
„ infantry....	133 battalions.	

It will be seen that these numbers do not agree with those shown in the table, as the latter does not show the Punjab Frontier Force, Hyderabad Contingent, &c., in detail.

The Punjab Frontier Force, now no longer on a different footing to the rest of the native army, consists of—

5 regiments of cavalry (including the Guides cavalry).
12 battalions of infantry (including the Guides infantry).
5 batteries of artillery (4 mountain and 1 garrison).

The Hyderabad Contingent consists of—

4 regiments of cavalry,
4 field batteries,
6 regiments of infantry.

In addition there are the Central India Horse (2 regiments), the Malwa Bhil Corps, the Bhopal Battalion, the Deoli and Erinpoora Irregular Forces (each of cavalry and infantry), and other corps, chiefly formed for local use, but under the orders of the Government of India, and available on an emergency for any duty.

British Troops.

In discussing the home army I have given full credit to the good results of the present system as regards the British troops in India. They form a force which is usually estimated as among the finest in the world, and at least equal in quality to any which has existed in India in past years. That the younger men—that is, men during the first two or three years of their Indian service—suffer seriously in health is undeniable; but no army composed of natives of a temperate climate can serve in a hot climate without a certain amount of illness. Moreover, a considerable proportion of the diseases which attack soldiers are either directly or indirectly caused by the mistaken action

Table showing the Strength of the Army in India on April 1, 1891.

		Bengal.		
British :—				
Cavalry	6 regiments	3,702		
Artillery	54 batteries	7,401		
Engineers		41		
Infantry	33 battalions	32,994		
			44,138	
Native :—				
Cavalry	19 regiments	12,027		
Artillery	2 batteries	452		
Sappers and miners		1,378		
Infantry	52 regiments	46,578		
Punjab Frontier Force		14,929		
Other corps, including Hyderabad Contingent		13,798		
			89,162	
				133,300
		Madras.		
British :—				
Cavalry	2 regiments	1,253		
Artillery	16 batteries	2,390		
Engineers		47		
Infantry	11 battalions	10,468		
			14,158	
Native :—				
Cavalry	4 regiments[1]	1,855		
Sappers and miners		1,453		
Infantry	32 regiments	25,521		
Other corps		4,434		
			33,263	
				47,421
		Bombay.		
British :—				
Cavalry	1 regiment	601		
Artillery	21 batteries	3,077		
Engineers		39		
Infantry	9 battalions	9,158		
			12,875	
Native :—				
Cavalry	7½ regiments	4,545		
Artillery	2 batteries	204		
Sappers and miners		832		
Infantry		21,123		
			26,704	
				39,579
			Total ..	220,300

[1] 1 regiment since disbanded.

of would-be moral reformers, and cannot therefore be taken as altogether bearing on the question of whether old or young soldiers are best for India.

The truth is that no fixed rule can be made; some men of 20, or even 19, years of age can serve in India with impunity, while others, constitutionally liable to fever, never become inured to the climate. In the large majority of cases, however, men cannot be relied on for hard and continuous work in India until 22 years old, and as our present conditions of service compel us to send soldiers there at least a year before that age, we must reconcile ourselves to the fact that about one-seventh of the British troops are permanently unfit for active service. This proportion would, however, be reduced in the event of a war in Afghanistan, where the climate is better suited to Europeans, and, as I shall state in the subsequent portion of the essay devoted to a consideration of the defence of India, I believe that when war comes it will inevitably take place beyond our frontier, and consequently that the health of the troops engaged will improve rather than deteriorate in the course of time.

The next point to decide is how long soldiers can serve in India without loss of efficiency. This also has been much disputed, and no hard-and-fast rule can be made; but from study of the subject and from personal observation, I believe that men go on improving (under ordinarily favourable circumstances) for seven or eight years, and that if they were allowed a furlough to England after five years in India, they could well serve there for a second period of five years. The more robust could complete three such periods, and should be allowed to complete their service for pension at home. I make this recommendation believing that it would be the most economical in the long run, and that no very large number of men would re-engage in this manner for pension, but that those who did so serve on would form a most valuable backbone for their regiments. It is not desirable that there should be too much equality of age among non-commissioned officers and soldiers; better that the former should be considerably older.

Native Troops.

A great diversity exists in the quality of the native troops, and there are consequently many degrees in their utility. The work of improvement is, however, going steadily on, and much may be hoped from the system of substituting corps formed from warlike races for those enlisted among people who have never had, or who have lost, a warlike spirit.

The *cavalry* is a very fine force, composed for the most part of men of good position, who are possessed of some small private means, sons of small proprietors, heads of villages, &c. These men do not enter the service empty handed, but by a system (peculiar, I believe, to India) provide their horses and contribute on enlisting to the cost of their equipment. Owing to the depreciation in the value of Indian coinage, it has been lately found necessary to increase the pay of the cavalry, and money thus laid out must be considered well expended.

In equipment, dress, and training the Indian cavalry is a practical and highly efficient force, vastly superior to any cavalry which could be brought against it. It is admirably officered, and a great part of it has war experience.

The *artillery* is a small force, but what there is of it is very serviceable. It is considered expedient that the greater part of the artillery in India should be European, and I thoroughly concur in this opinion.

The *engineers*, or sappers and miners, are among the most serviceable troops in India, being enlisted from low-caste men who will undertake any duty, and are also very courageous.

The total strength of all ranks in the three Presidencies is 3,663.

The *infantry* varies greatly in quality, but is, as a rule, of excellent physique, the Indian army being essentially a long service force. An attempt has recently been made to form an infantry reserve, but the strength does not at present exceed 6,000 men, and it is doubtful if a reserve of any practical strength could be formed. The Indian soldier enlists from choice, not from necessity. He looks upon the army as affording him an honourable career and an assured sufficiency for his old age.

Although the warlike spirit is less universal than it was 100 years ago, there are still immense numbers of natives of India who turn naturally to the profession of arms, and from them our most efficient infantry regiments are raised. Being able, as we are, to employ them in climates suited to the different nationalities, we have a large proportion of regiments formed of the more warlike races—Sikhs, Gurkhas, Pathans, &c.—who are probably fully equal to all but the best European infantry. All that they want is the leading of British officers whom they know and in whom they have confidence. The establishment of eight European combatant officers is not sufficient for a serious war, and though it would be extremely difficult to increase it, it is most important this should be done.

Deferring for the present the question of officering the native army, a few remarks will be made concerning the organization of the native infantry.

Each battalion is composed of 8 companies (except 2 Bengal regiments which have 9 companies), and the strength of all ranks in the Bengal regiments is 912; in Madras regiments it is 844, and in Bombay regiments 832.

All battalions are linked together in groups of three, and while the separate identity of each is carefully preserved, this system affords a very satisfactory method of keeping up a constant flow of sufficiently drilled recruits to regiments on active service, as under no circumstances could more than two-thirds of the regiments be simultaneously employed. The third battalion in each group would then act as a depôt, and, having its complete establishment, could train large numbers of recruits far more efficiently than could an ordinary depôt.

The Officers.

The *native officers* occupy a position which is indefensible in theory, but which actually works extremely well. They are, as a whole, an

admirable body of men; brave, efficient in war, partly from long training and partly from a natural soldierly instinct, contented with their lot, and loyal to the Government. They have hitherto reached the commissioned grade almost entirely by service in the ranks, but of late years an attempt has been made to induce native gentlemen of high standing to enter the army as commissioned officers. As yet this measure has only occasionally answered, but there are now a certain number of natives of rank holding commissions, more especially in the cavalry. If this could be developed it would probably be found possible in the course of time to allow such native officers to rise to much higher rank than is at present possible, and the opening for such a rise seems to be readily found in the Imperial service troops. As the contingent furnished by the more important States becomes larger, higher military rank would naturally be conferred on the senior officers, and if we wish to attract native gentlemen of the right stamp into our cavalry regiments, they too must be given some prospects of promotion that is really worth looking forward to.

The question of the best system of supplying the Indian army with *British officers* is one that has for years been an insoluble problem. The destruction of the greater part of the Company's army in the Mutiny left India with a large number of unattached officers, many irregular regiments with very few officers in them, and a pressing necessity for quickly employing the officers and re-forming an army. The difficulty was got over at the time by the formation of the Staff Corps, but it was an ill-considered expedient, bound in time to result in an accumulation of senior officers, and a too heavy pension list.

The new pension rules will in time have a good effect, but certain changes still seem desirable. I am aware that this is a most difficult matter to arrange, and I therefore make the following suggestions with diffidence:—

1. That increased inducements should be offered to officers to retire after 25 years' service, whereby promotion would be accelerated, and fewer officers would serve on for the highest pensions.

2. That a certain number of officers be permitted to retire on gratuities, as in the British service, the gratuities being calculated on a corresponding scale with regard to pay and prospect of pension.

3. That no officer should be eligible to return to regimental duty if employed for more than ten years on continuous staff or departmental duty.

4. That any officer entering civil employment should resign his military commission after five years in such employment.

5. That by degrees a system of regimental promotion should be initiated, subject to selection; so that no promotion should be unduly rapid, and that none but thoroughly efficient officers should be placed in important and responsible positions.

Note.—The active list of the Indian Staff Corps on April 1, 1892, numbered 2,335 officers, thus composed:—

General Officers, 28; lieutenant-colonels, 413; majors, 208; captains, 623; lieutenants, 870; probationers (lieutenants and 2nd lieutenants), 193.

The Imperial Service Troops.

In addition to the Regular army an important force is in process of formation, known as the Imperial Service Troops.

These troops are to be raised, armed, equipped, paid, and disciplined by the feudatory States of India, under the guidance and supervision of selected European officers.

In time of peace they are to be completely under the control of their own States, but in time of war they will at once pass under that of the Commander-in-Chief, and being brought as nearly as possible to the standard of our own troops, and supplied with their own transport, it may be hoped that they will form a valuable addition to our strength.

The troops consist of the three arms and number about 20,000 of all ranks.

In addition to the increase of strength afforded by them it is hoped that their maintenance and gradual increase will result in the disappearance of the large, ill-trained, and worse equipped armies hitherto maintained by the feudatory States, which, although comparatively harmless from their inefficiency under ordinary circumstances, would undoubtedly have added to the difficulty of maintaining order throughout India at a time when a great part of the Regular army was employed beyond the frontier.

The Kashmir Imperial service troops have already been actively employed, and favourable mention has been made both of their training and fighting qualities. It may be expected that the troops raised in the more warlike States will prove to be of superior quality.

The Volunteers.

On March 1, 1892, the various corps of Volunteers in India reached the following numbers of efficients:—

Cavalry:—			
Bengal...	1,701		
Bombay..	45		
		1,746	Organized in 23 troops forming 10 corps, and 11 companies of mounted rifles forming 9 corps.
Artillery:—			
Bengal...	218		
Madras...	176		
Bombay..	124		
		618	Organized in 7 batteries forming 5 corps.
Infantry:—			
Bengal...	10,730		
Madras...	5,877		
Bombay..	3,542		
		20,149	Organized in 290 companies forming 53 corps.
	Total	22,513	of all ranks.

The Volunteers are organized in corps of varying strength, and when possible the corps are formed into administrative battalions.

The vast area over which they are scattered, and the fact that they are all busy men, renders their training as Volunteers a difficult matter; but the independence of character common to Europeans in India, the position of authority occupied by the lowest of them, and the sporting tastes and consequent soldierly aptitude shared by nearly all in a greater or less degree, render them a strong factor in the problem of controlling the great Indian Empire. Thanks to their formation the helplessness and want of directed action which characterized the conduct of too many Englishmen in the days of the Mutiny will never recur.

With regard to the constitution of the force, it appears that the proportion of artillery Volunteers is too small.

If possible, a small corps should exist in the neighbourhood of every fortress to take the place of Regular artillerymen, who would have their hands full in the event of war.

A wise liberality is shown in the armament and equipment of the Volunteers, and it is very necessary that they should always use the same rifle as the British Regular troops.

The admission of Parsees and Eurasians into the ranks of Volunteers has caused much discussion. It appears to be an advisable step, as both races are as much dependent on the maintenance of British rule as the English themselves.

Command.

The chief question of organization, and one which is warmly debated, is whether the retention of three separate armies is still necessary.

The arrangement, which renders three Headquarter Staffs necessary, is an expensive one, but it cannot be decided against on that ground only. The expense could pass well enough if it were apparent that any great increase of efficiency resulted from it. Divided authority is, however, always undesirable, and under existing circumstances, with rapid communication between all parts of India, it no longer seems necessary to have separate Commanders-in-Chief in the three Presidencies.

While deprecating undue centralization, it seems better that the three armies of India should become one, with one Commander-in-Chief and one Headquarter Staff.

This fusion of the armies would also bring about a more general relief of one regiment by another in the various stations. This is very desirable, except in the case of regiments which have been raised with the understanding that they are to serve in peace time in their own districts.

It has been recommended that four army corps should be formed, but this seems undesirable on the score of expense, as four large Staffs would be required in addition to that of the Commander-in-Chief.

The *division* seems to be the most suitable command, each being divided into as many brigades as its strength may require.

One Commander-in-Chief would be unable to conduct detailed

inspections, except in the larger stations and camps of exercise; and the inspection of smaller bodies might well be relegated to the inspectors of cavalry and artillery.

The Defence of India.

Our Indian army is maintained at its present strength for one purpose only, the defence of India from invasion by Russia. It has many other duties to perform, and there is seldom a period of six months during which no part of it takes part in warlike operations; but these are comparatively trifling tasks which call for the employment of but a small part of its strength. All its efforts and training are directed to one end, the coming struggle with Russia.

Events in Asia are moving rapidly, and a glance at the map shows that to a great extent Russia now has the great game in her own hands. That is, she can with impunity advance further and further eastward, strengthening herself as she advances, and at the most favourable moment to herself can compel us to engage in a struggle for existence as a great nation. For the loss of India would break up the Empire as surely as would an invasion of England.

As the organization of the Indian army, like that of all others, must depend on the nature of the operations which it is intended to perform, it is a great benefit that our war policy in the East has at last been decided on and announced. Lord Dufferin gave it to the world in no uncertain tones in his speech at the Guildhall on May 29, 1889: "I hold it," he said, "to be an essential principle that under no conceivable circumstances would it be compatible either with the good faith of the contracting Powers or the safety of the Empire that the agreement come to by us with Russia on behalf of the Amir in regard to the northern boundary of Afghanistan should ever be modified or ignored. Any further approach of a great foreign military Power towards the confines of India would entail upon the latter country such an intolerable amount of expense in the shape of additional fortifications and other measures of defence as would become absolutely intolerable, and would be less preferable than any other alternative, however serious."

This is an authoritative statement, and our recent action has shown more plainly than even such words as these that we intend to adopt the necessary and honourable course of maintaining the integrity of Afghanistan. The only way in which India can and will be defended is by our moving boldly forward to meet Russia whenever she enters Afghan territory.

Our position at and about Quetta gives us great strategical power, and if the railway were carried forward to Kandahar, as it will be before long, it is my belief that no attack on Southern Afghanistan could succeed, and that an attempt on the part of Russia to establish herself in the neighbourhood of Kabul and Ghazni would be rendered a most precarious operation.

Our great need is the extension of our railways to Kandahar, Ghazni, and Kabul, which would entail no very serious outlay and result in an immediate and large development of trade.

Whether Herat and its province could be held is a doubtful point, but I believe that we could anticipate Russia in the three other Provinces, and that to do so would be the only safe course for us to take. The matter is very clearly put forward in an article by Colonel Bell, R.E., in the "Royal United Service Journal," No. 154, and he estimates that with the extension of railways and with a friendly Afghanistan we could meet Russia in that country and so defend India in the best possible manner with 75,000 men.

If, on the other hand, we wait and allow Russia to establish herself in Afghanistan, our situation would be very much worse. An immense army could in the course of a few years be collected there, and judging by the known characteristics of Oriental troops, our armies might well be considered beaten before a shot was fired.

Without further discussion, I shall assume that we intend to pursue the bolder and safer course; it remains to be seen if our army is so organized that a force of 70,000 men could be thrown quickly into Afghanistan, and maintained there for a considerable time in full strength and efficiency. To meet a European enemy half this force would have to be British troops; and the 35,000 white men are undoubtedly forthcoming and of the best quality.

The 35,000 native troops could be jealously selected, none but regiments formed among warlike races, and commanded by the best officers, being chosen.

It is fortunately needless to urge the necessity of preparation; in this matter India is far ahead of England. Suddenly as the storm may burst, there must be premonitory symptoms, and it can safely be stated that the friendly occupation of Afghanistan could be carried out without delay at any time, almost on any day.

It must not be assumed, however, that the army of India is unnecessarily strong; such is by no means the case.

On the approach of war there would be a general move northward throughout the peninsula. A great part of the Bengal troops would furnish the army of occupation of Afghanistan; some of the Madras troops would reinforce the garrison of Burmah, where trouble would arise were war to come before the settlement of that country has been completed; others would take the place of those moved from Bengal; in the same way the Bombay troops would move into Southern Afghanistan, hold lines of communication, and fill the more advanced stations denuded of their ordinary garrisons. All would be wanted, and the diversities of race and absence of sympathy between the Southern armies and the people in whose territory they would find themselves would not be without their advantages.

The cities of Calcutta, Madras, Bombay, Rangoon, and Karrachi are easily defended, as are the seaports of Ceylon; in fact, the whole army of India may be considered available for land defence.

Each year this army progresses in military science; its armament and its mobility are improved; unnecessary stations are abandoned; and troops are concentrated in suitable strategic positions.

Let it but continue in the same path until the hour of stress comes, and it will not be found wanting.

V. The Defence of the Colonies and Coaling Stations.

Although these appear to be totally different matters, they can really be best discussed together, as, from a military point of view, their circumstances are similar.

The defence of the colonies really resolves itself into a defence of their cities, and colonial cities almost without exception are situated on or very near harbours, which are fortified, or in process of being fortified, as coaling stations.

When coaling stations are situated in colonies which have a sufficiently large British population, it has been our policy to encourage the formation of local defence forces, and undoubtedly this policy is a right one. Nothing so much develops public spirit as the acknowledgment of the principle that one of the first duties of a community is to defend itself as soon as it is strong enough to do so.

The larger colonial forces are described in some detail in the following pages, and a few lines are devoted to the smaller colonies and to the stations, which form bases for our naval system in all parts of the world.

I would here desire to state my conviction that the condition of the various colonial forces depends in a great measure on the encouragement given by the Imperial Government (by no means an unvarying factor), and even more on the efforts of colonial Governors.

It will be noticed by any one who studies the matter that when a Governor gives personal attention to defence, and has the requisite knowledge to give full effect to his efforts, the military and other defences of a colony flourish; and under a Governor who may discourage the military spirit, or who may consider that his time and attention should be wholly devoted to other matters, the defence forces immediately languish. In other words, the military spirit and public spirit which every community must have which wishes to prosper in safety exist in all our colonies; all that is required is proper encouragement and leading.

Regarding the strength of the Imperial garrisons maintained in the colonies and naval bases, I cannot see any probability that they can be safely reduced for a long time to come. It would be the worst possible economy to reduce the garrisons of Gibraltar, Malta, Bermuda, and even worse to reduce those of more distant stations, such as Hong Kong and Singapore.

There are a school of economists who might advocate this, and rely on slipping in reinforcements immediately before the outbreak of war. All that I can say of them is, that they are very sanguine, or quite unable to apply the lessons of experience.

The French, with their very powerful navy, second only to our own, and with immeasurably less calls upon it, have decided that all distant garrisons must be maintained in peace at the strength which would be required in war. We are accustomed to follow the lead of France or Germany in most military matters; let us do so in this.

A few words only need be said about the degree and manner in

which the colonies can assist one another in war, and thereby increase their strength.

This cannot be done for a good many years to come, and then only by means of naval action.

As a rule the colonies are so far apart as to be quite beyond the reach of mutual assistance; the only exception being Australia, which certainly must assist Tasmania, and would probably be compelled to assist New Zealand, if the latter were to be in danger of invasion at any time. The safety of Australia depends in great measure on her distance from a possible enemy, and this distance would be dangerously reduced were New Zealand to fall into unfriendly hands.

So long, however, as there exists a United Britain, and each and all of the colonies recognise and perform their military duty, no such disaster can take place.

Australia and Tasmania.

The "defence forces" of the colonies of Australia, being independent of one another, must be detailed separately; but it is obviously to their interest that the additional strength and the economy of power afforded by organization for mutual support should be sought for without further delay.

The forces of each colony have been well described as a watch-dog at its door; and when the comparative weakness of some of the colonies, and the vital necessity of defending the weak points in a country are remembered, the wisdom of combining the efforts of the watch-dogs seems sufficiently obvious.

In considering whether the total military strength of Australia, when combined, is sufficient for defence, the following points must be taken into account:—

1. The points within striking distance of an enemy.
2. The strength which could be brought against those points.
3. The facilities afforded by the railways for concentrating the necessary troops at any point or points liable to attack.

The situation of Australia renders it practically safe from any attack on a large scale, as long as it remains a dependency of Great Britain, and there remains a British Empire. Taking the worst combination which is at all likely to be arrayed against us—France and Russia—Australia would no doubt have its commerce vigorously attacked, and if unprepared would be liable to severe injury to its cities; but even in their present "watch-dog" state, I believe that the defence forces are amply strong enough to hold their own against any force that could be thrown on Australian shores, and that with combination and the existing railway communications they would be stronger than would be necessary.

We are, however, considering the best organization for Imperial needs, and under this head the military problem of Australia becomes a much wider one than if strictly limited to defence.

Assuming, then, that Australia, with her present strength, could dispose of any force that could be brought against any one point

by increase

and then

eyond the
lia, which
npelled to
nvasion at
re on her
be danger-
nds.
l each and
y, no such

ing inde-
but it is
and the
ort should

watch-dog
e colonies,
ountry are
atch-dogs

Australia,
s must be

ints.
rating the

from any
of Great
the worst
s—France
rigorously
ary to its
lieve that
n against
that with
would be

Imperial
a becomes

gth, could
one point

Table of the Defence Forces of the Colonies of Australia.

Queensland. (Population, 394,000.)

Permanent troops :—	
Artillery and submarine miners	104
Partially paid forces :—	
Field artillery, 2 4-gun batteries	130
Garrison artillery, 5 batteries	281
Field company engineers	62
Submarine miners	30
Mounted infantry	700
Infantry, 4 regiments	1,586
Volunteers :—	
3 regiments	1,271
Total number of trained soldiers	4,164

Rifle clubs, number not stated.

New South Wales. (Population, 1,134,000.)

Permanent troops :—	
Staff and departments	54
1 battery field artillery	56
3 batteries garrison artillery	500
1 company submarine miners	21
Medical staff	15
Details	14
	660
Partially paid corps :—	
1 regiment cavalry	413
2 batteries field artillery 1 position battery 6 batteries garrison artillery	532
1 company engineers	119
1 company submarine miners	115
1 regiment mounted infantry	389
4 battalions of infantry	2,699
1 company Medical Staff Corps	91
Commissariat. Transport	39
Total number of trained soldiers	5,057
92 rifle companies	5,386

Victoria. (Population, 1,137,000.)

Permanent troops:—	
Artillery	286
Engineers	31
Partially paid corps:—	
Cavalry	71
Horse artillery	90
Field artillery, 3 batteries	268
Garrison artillery, 8 battalions	723
Submarine miners	84
Field company engineers	100
4 regiments infantry	2,916
Ambulance	40
Commissariat. Transport corps	79
Unpaid corps:—	
Mounted rifles	1,209
Rangers (including 40-pr. position battery)	1,356
Total number of trained soldiers	7,253

Rifle clubs, about 2,000.

South Australia. (Population, 315,000.)

Permanent troops:—	
1 battery garrison artillery	50
Partially paid corps:—	
1 squadron lancers	75
1 field battery	85
2 batteries garrison artillery	128
3 battalions infantry	1,200
Mounted rifles	300
Total number of trained soldiers	1,838

Rifle clubs, about 1,000.

Western Australia.

Rifle Volunteers, 600.

King George's Sound, a very important coaling port, is being fortified, and would require permanent artillery. This would have to be furnished by one of the neighbouring colonies or by the navy, while local gunners were being trained.

on her coasts—variously estimated at from 2,000 to 5,000 men—without unduly weakening other vulnerable points, the question is: Is it in the interests of Australia that she should create a military organization which would enable her to come to the assistance of the mother country in the great day of stress which must come sooner or later, and if it is in her interest, can she do so without imposing too heavy a burden on her shoulders? I believe the answer to these questions to be, "Yes." What may the state of affairs be fifty years hence no man can foretell, but I believe that the safety and prosperity of Australia are entirely bound up with and dependent on the unity and power of the British Empire, and that for many years they must continue to be so bound and dependent.

That being the case, Australia is called upon, equally with the mother country, to do her part and bear her share of the burden; and I believe that the majority of Australians are willing to perform their duty, both from a sense of what is right and a sense of what is advisable and even necessary. The question then is: How is a force to be formed that, without being too costly, and without falling too heavily as a tax on flesh and blood, can be readily expanded into an army which in time of need can help to turn the scale when the fate of the Empire trembles in the balance?

I believe that a Militia formed on the lines of the Canadian force, with its defects eliminated, gives the best solution of the problem. I advocate, therefore, the following organization, which would make use of all existing forces and systems, and indeed differ from the latter only in being more uniform and comprehensive. With the exception of the first proposal, my suggestions are for the most part based on those of General Edwards.

1. The forces of the various Australian colonies to be placed under one central authority, consisting of a Board under a Federal Minister of Defence. A General Officer of the Imperial army with wide experience, and especially colonial experience, to be chosen to inspect in peace and to command in war. He should be active and comparatively young, and a Major-General would probably be best. He could be given the local rank of Lieutenant-General, as the larger colonies employ a Major-General.

2. The armament should be uniform throughout (this is very generally the case now), and the terms of service should, if possible, be uniform also.

3. A military college should be formed for the education of officers, modelled on that of Kingston, Canada. A considerable part of the cost would be met by the abolition of the present system of sending officers to study in England.

It being desirable that gentlemen of the best class should hold commissions in the Australian army, students at the college should contribute towards its expenses; and care should be taken that none but those thoroughly eligible should receive commissions.

A certain number of commissions in the British army should be offered annually for competition.

4. Small permanent corps should be maintained as at present, and

should be utilized as schools of instruction for non-commissioned officers and men.

5. The greater part of the force should consist of Militia, the whole of which should be embodied annually for training, simultaneously if possible. The period of service, the length of training, and the method of raising the required number of men must be settled by agreement among the Governments of the various colonies.

6. At the same time the Volunteer system should receive every encouragement, especially in the cities, where there are greater facilities for this form of military training. Officers and men should be encouraged to undergo the same scientific training as those of the Militia.

7. The term of Militia service should include a certain number of years in the Reserve, and Reserve men should be given inducements to perform a modified annual training, either with Militia or with Volunteer corps.

8. A complete scheme of defence for the whole country and Tasmania should at once be elaborated, which would include all arrangements for organizing transport, commissariat, medical staff, &c. This would require constant alteration as the military strength developed, and would also of course depend on the naval strength of Australia.

9. A small-arm manufactory, gun wharf, and ordnance store should be formed.

If these measures, and others which might easily be suggested, could be carried into effect, I believe that Australia would gain enormously in strength, that the burden of war expenditure would be more equally divided than at present, and finally that the risk which now exists of a weak spot being found in her armour, owing to the backward state of some of her colonies, would be removed.

Like many other countries, Australia is at present passing through financial troubles, and these must affect the question of military expenditure; but, while having no desire to urge any waste or unnecessary expenditure, I trust that the counsels of those foreseeing statesmen will prevail who see the truest economy in a judicious and sufficient preparation for war.

The tables showing the existing Australian forces indicate the latent power and the strong military feeling of the country, and indeed it would be strange if the strongest and most independent of Britannia's children were to fail in that spirit which made her the queen among nations.

The strength of the Australian naval forces does not come within the scope of this essay, though, of course, it immediately affects the availability of the land forces. It is highly satisfactory that so strong a determination exists that they, too, should be adequate to the defence of the coast towns, harbours, and shipping.

With a small but efficient navy, employed on a carefully thought-out scheme of defence, and a land force, sufficient on a peace footing for any ordinary emergency, and capable of large expansion, Australia can look forward with confidence to the great struggle, feeling that she can hold her own and come, if required, to the help of the mother country.

Tasmania.

Tasmania must evidently be included in the Australian scheme of defence, as, if left to its resources, it might fall to an enterprising enemy, and would then become a great source of danger to the mainland. Its existing forces are very small, and a Militia Act appears to be desirable.

I have been unable to obtain recent figures, but, on January 1, 1889, the following were the numbers :—

a. There was a small corps of *permanent artillery*, employed to man the defence of Hobart Town ; the establishment was 50 of all ranks, but the effective strength only 27. This corps was intended also to instruct the Militia artillery, but is obviously too weak unless kept up to its establishment.

b. Militia.—Artillery..... 147 effectives of all ranks.
Torpedo corps.. 68 „ „
Infantry..... 368 „ „

c. Rifle clubs numbering 1,500 members and 315 white police are also liable by law to serve for the defence of the colony, and, with a proper organization, could no doubt form a serviceable and sufficient force.

New Zealand.

Although New Zealand is rendered comparatively safe by its position from serious attack by a European Power, it is liable to be raided by Russia or France.

A greater danger, however, exists in the possibility of our falling out with China and Japan, both of which nations now possess large modern fleets and well-equipped armies. New Zealand is exceptionally well off as far as fixed defences are concerned, the Government having spent money liberally in fortifications and judiciously in guns, avoiding the costly and fragile heavy guns which some of the colonies find to be of the white elephant class.

The defence force is sufficiently strong in numbers, or nearly so, but it is at present very defective in armament and organization. An attempt is now being made to put these matters on a thoroughly satisfactory footing, and I would state that in my opinion the Canadian system as it will stand when perfected, by Major-General Herbert, is the most suitable for New Zealand.

The composition of the force is given below. The torpedo corps should be doubled in strength, though the additional men need not be permanently employed.

Permanent troops :—	Garrison artillery....	150	
	Torpedo corps.....	50	
Volunteers :—	Naval artillery.....	1,200	
	Cavalry.....	700	
	Artillery.....	700	(with 31 guns).
	Engineers	150	
	Rifles.....	4,450	
	Total	7,400	

Canada.

The Dominion of Canada is at present utterly unprepared for war. It is fortunately true that war is not a likely event in her case, but it is at least a possibility. It is perfectly conceivable that Canada and the United States might come to blows, deplorable as such an event would be; and France, with her old and ill-defined rights and her aggressive disposition, might at any time force a single-handed war upon us or involve us in the great struggle of nations which many of the wise consider inevitable.

The Imperial garrison is so small as hardly to be worth counting; and must be considered as intended to guard Halifax against a *coup de main*, and to secure a landing place for reinforcements in the event of war.

It consists of 1 company of garrison artillery.
2 companies of R.E. (one fortress and one submarine miners).
1 battalion of infantry.

On the other hand, the Staff is very large and expensive, consisting of a Lieutenant-General with an Assistant Military Secretary, and an Aide-de-Camp, an Assistant Adjutant-General, two Deputy Assistant Adjutant-Generals, a Colonel on the Staff Commanding the Royal Artillery, and four other Staff officers.

This Staff is obviously unnecessarily large, but the explanation given is that in the case of war the Lieutenant-General would take command of all the troops in Canada.

Apparently a Brigadier-General with one Staff officer would perform the duties equally efficiently, and the Lieutenant-General and his Staff could be furnished when required.

The Militia is not, as a whole, in a satisfactory state, and unfortunately the infantry, the most important part of it, is also the least efficient.

Canada (with the exception of the Channel Islands) occupies the proud position of having led the way for the mother country and the other dependencies of the Crown in instituting universal military service. Her Militia system, with trifling alterations, would be an excellent one, and applicable to most, if not all, parts of the Empire.

By law, every male between the ages of 18 and 60 may be called on to serve in the Militia, which is constituted as an active and a reserve force.

The establishment of the Active Militia is limited to 45,000 of all ranks, but unfortunately it does not usually exceed 37,000; on January 1, 1891, its strength was 37,613.

The Militia Reserve on the same date numbered about 650,000.

More important, however, than the strength of a force is its efficiency, and it is to be regretted that only a part of the Canadian forces are trained each year.

During 1891, the following numbers received training, for the most part of 12 days' duration:—

	Officers.	N.C.O. and men.
Trained at the local headquarters ..	657	7,878
„ district camps.....	698	7,629
Total.....	1,355	15,507

Generally speaking, the city corps of Militia performed their training at the local headquarters, and the rural corps in the camps formed in each of the twelve military districts into which the Dominion is divided. The training in camp is continuous, whilst that performed by the city corps resembles the Volunteer system of Great Britain.

This distinction in the method of performing the training is not sanctioned by the Militia Act, but it has been found necessary to relax the conditions of service, so that two classes have sprung up in the Militia differing as completely as do the Militia and Volunteers at home.

Major-General Herbert, now commanding the Canadian Militia, is of opinion that the Volunteer system is the most suitable to the conditions existing in large cities, and the facts adduced in his interesting and detailed report for 1891 seem to confirm his opinion. He makes many recommendations to Government, some of which are embodied in the following suggestions.

It is well to mention that the engineers and infantry appear to be the arms which most require improvement.

Recommendations.

1. The whole force urgently requires re-arming and a great part requires new equipment. It should be put on the best footing in both respects. The most economical course in the long run would be to buy the Lee-Metford rifle at once, rather than to go through the stage of using the Martini-Henry rifle for a time. For rural corps proper armouries would be necessary, with permanent caretakers, who should be pensioners from the Imperial Service, employed as drill-instructors for recruits and responsible for the care of arms, equipment, and clothing when not issued to the men.

2. The city corps should be organized, when that course is considered preferable, as Volunteers; that is, they should become efficient in the same way as in Great Britain. The standard of efficiency should be raised, as 12 days' drill performed from time to time is not a sufficient training; at least 25 drills are necessary, after a sufficient training as recruits.

3. After three years' efficiency, Volunteers and Militia alike should be permitted to pass into the Reserve, when they should be called upon to perform a moderate training, and earn a small capitation grant for their corps.

4. When recruiting languishes in the rural corps, the number of companies in battalions should be diminished, and when battalions are very strong and efficient the number should be increased.

5. A rural battalion composed of suitable men should be converted

into a pioneer battalion, as recommended by Major Mayne, R.E.; the existing independent engineer companies being disbanded or converted into another arm.

6. The permanent artillery is of great importance, and an effort should be made to complete the small establishment by obtaining time-expired artillerymen in Great Britain. If employment could be given to a retired Imperial officer, he would have no trouble in getting a sufficient number of men of good character.

7. The constitution of the schools of instruction being unsatisfactory, and the men employed being too young, a leavening of time-expired infantry soldiers of the Imperial Service would be advantageous. These men being about 30 years of age would have many years of good work in them, and if carefully selected would be most valuable.

8. In all strong battalions, when a suitable class of men exists, a company of mounted infantry should be raised; the companies of each military district being trained together in camp under a selected officer.

9. A reserve of guns is required for the field batteries; and a reserve of ammunition is absolutely necessary both for the field and heavy guns: more heavy guns are also required.

10. Finally every effort should be made to raise the Militia to the strength sanctioned by law—45,000—and the annual training of the whole force should be carried out as a matter of course; the most suitable time for rural battalions being carefully selected.

The cost of re-arming and equipping the Militia, and a supply of the necessary reserve of arms and ammunition for war expansion, would be very heavy; but I have no hesitation in saying that it is an absolute necessity, and that without it the forces would be useless for defence. It is a matter of national insurance and should be faced. Judging from what happened at home very recently, it is probable that a considerable part of the cost of the new armament would be covered by a Patriotic Fund. All that is required is for the matter to be well ventilated, and put clearly before the public. When Englishmen see an obvious necessity before them they do not shrink from cost, and when the interests involved are so immense and the danger of unpreparedness so thoroughly recognised, the necessity may well be called obvious.

South Africa.

The Cape of Good Hope and Natal are the only large colonies in which a considerable Imperial garrison is maintained. This arises from the fact that there has constantly been a danger of native wars; and also from the extreme importance to us of the Cape as a naval base. The climate of South Africa being suitable to Europeans, it is probable that we shall continue to maintain larger garrisons than are absolutely necessary for the defence of Simon's Bay, Port D'Urban, and other harbours, even when native wars have ceased to occur.

The Imperial garrison in South Africa consists of:—

1 regiment of cavalry.
1 company garrison artillery.
1 „ mountain artillery.
1 „ engineers (fortress).
2½ battalions of infantry (the other ½ battalion in Mauritius).

The local land forces of the Cape Colony are as shown in the table, and may be considered sufficient in strength; they are of excellent material. They require, however, to be carefully kept up to the standard of efficiency.

The same may be said of the local forces of Natal, where the Carabiniers and mounted rifles are a most useful force, maintained on a liberal footing.

Cape Colony. (Land Forces.)

Volunteers who undergo five drills every half-year after being passed as efficient, and draw a capitation grant of 4*l.* per annum.

	Officers.	Other ranks.
Mounted corps	28	569
Artillery	27	494 (12 field guns).
Infantry.....	124	2,954

There are also the Cape Mounted Rifles, a permanently embodied corps in a high state of efficiency.

Strength—33 officers and 780 other ranks, with 4 field guns.

Natal. (Land Forces.)

Volunteers who are paid for 10 days' drill per annum at the following rates:—

Mounted men..... 6*s.* per diem,
Dismounted men..... 5*s.* „ in camp,
or 3*s.* if not in camp.

There is no limit to the strength of the force, and most liberal arrangements exist as to ammunition—a judicious form of expenditure.

There is an annual horse allowance to efficients of 10*l.*

Strength of all ranks.		Total each arm.
Natal Carabiniers.....	381	704 cavalry.
„ Mounted Rifles	323	
Durban Volunteer Artillery...	72	72 artillery.
Natal Royal Rifles.....	248	435 infantry.
Royal Durban Rifles.....	187	

There are also 178 mounted police.

The West Indies.

In the event of a combination against us of France and Russia, it is highly probable that we should be attacked in the West Indies,

and it is quite possible that this might be the case in a war against either of those Powers.

The eastern islands are within a convenient distance of France, and if our fleet were to be engaged in all parts of the world simultaneously, at the outbreak of war, it is exceedingly probable that St. Lucia could be seized and used as a base of attack against all the remaining islands.

The West Indies, especially Jamaica, St. Lucia, and Antigua (which have good harbours), will be extremely important when the Isthmus of Panama has been cut, or the Nicaraguan Canal made; and although no doubt it might theoretically seem preferable for an enemy to defeat us elsewhere and then obtain these islands by treaty, it would probably be found better to capture them at once, and use them as a base from which to attack our commerce.

Port Royal in Jamaica and Port Castries in St. Lucia have been strongly fortified, and small garrisons are maintained in those islands. After mature consideration it has been decided not to hold Antigua. As it is unfortified, it would not be of much use to an enemy unless our sea power were destroyed.

In considering whether the West Indian garrison is sufficient to defend the two fortified harbours, the position and other circumstances of Jamaica and St. Lucia must be considered.

Jamaica.

Jamaica is so distant from all probable enemies that it may be considered as only liable to a raid during the early stages of a war. Martinique is the nearest hostile naval base, and is 1,500 miles distant.

The present regular garrison could meet any attack of that nature, and slightly increased, as recommended, and the local defence force developed, the island would be strong enough to hold its own against a much stronger attack which might in the course of a long war be directed against it.

The following troops constitute the regular garrison :—

Garrison artillery.....	1 company (about 110 of all ranks).
Submarine miners	1 „ raised locally; the establishment is 60, present strength, 85.
Line infantry	3 companies (about 300 of all ranks).
West Indian infantry ..	6 „ „ 550 „

The British artillery should be increased to 200, and supplemented by local artillery, a strength of 100 of which is authorized, but has not yet been raised. Jamaica could then be considered perfectly safe against any force which could be brought against it.

The regular troops are supplemented by a force called "the Volunteer Militia," a singular title.

The establishment of this force is 600, but the strength is very fluctuating; at present it is 100 below the establishment, while it has been as high as 180 above it.

The men are raised by companies, the period of service being

three years, and it is frequently found that at the end of the three years the men are tired of service, decline to re-engage, and the company is broken up. Then a new company is raised elsewhere, and the strength is restored.

There are about 800 men resident in Jamaica who have passed through the ranks.

Although styled Militia, the force is practically in peace time a Volunteer force. The men are not paid, but provided with arms, uniform, and medical attendance.

These are not sufficient inducements, and it seems certain that eventually the force must become a partially paid Militia, when it would be easy to raise 1,500 or even 2,000 men at a moderate cost, which would make the island quite safe.

The establishment of 600 is thus divided:—

Garrison artillery.....	150
Mounted infantry	50
Infantry.....	400

St. Lucia.

The garrison of St. Lucia is very small, consisting only of a garrison company of artillery (about 110 of all ranks).

This strength should be increased to 200, as recommended for Jamaica, and supplemented by a local company, which is sanctioned, but not yet raised.

The British infantry (five companies) from Barbadoes should also be stationed in St. Lucia; they are useless in the former island, and would make St. Lucia safe. The only obstacle to the transfer appears to be the cost of building barracks, which should not stand in the way for a moment.

It is necessary, and, therefore, would not be objected to.

Sierra Leone.

In his Naval Prize Essay, Captain Craigie explained the great importance of Sierra Leone. It is within 500 miles of Goree, and is therefore liable to a sudden attack. It is now strongly fortified, but the garrison is quite inadequate. West Indian troops would be useless for the defence of this most important coaling station, as they could not be expected to face an European enemy. Moreover, they stand the climate of West Africa no better than do Europeans, and are actually more expensive than they are.

The garrison of Sierra Leone should consist of 1,000 Houssa infantry with a small British force of infantry and artillery as a backbone.

The present local artillery and engineers are formed of the right material, and there appears to be no reason why the infantry should be raised from the unwarlike coloured inhabitants of the West Indies.

Mauritius.

I shall notice Mauritius in conjunction with Sierra Leone, as they have a military point of resemblance in that both are inadequately

garrisoned, being, as they are, liable to sudden attack from an easy distance on the part of France.

Mauritius is close both to Bourbon and Madagascar.

The fortifications of Port Louis are amply strong enough, and the regular garrison, with the assistance of a local force, could hold Fort Adelaide and Fort George; but no such force exists.

There is no reason to doubt the loyalty of the inhabitants of Mauritius, and, if their loyalty were at all doubtful, the best way to strengthen and confirm it would be to show confidence in them, and call upon them to take their part in the defence of their country.

As there is a larger European population than in any other tropical colony, a Militia of considerable strength could easily be raised.

Ceylon.

Ceylon is a very important possession, and should therefore be made as strong as possible by gradual additions to the local force.

The Imperial garrison consists of

1 company of garrison artillery.
2 companies of Asiatic „
1 local company of submarine miners.
½ fortress company R.E.
1 battalion of line infantry.

The local defence force is very promising, and has recently made more progress than that of any other colony or dependency. The force consists of Volunteers, and numbers about 1,100.

It may here be noted that the "Asiatic artillery," of which there are two companies in Ceylon, are recruited in India, mostly in the North-West Provinces.

Remaining Garrisons.

I have nothing to add to my statement that no reduction is possible in the garrisons not yet mentioned.

These are Malta, Gibraltar, Aden and its dependencies, Hong Kong, Singapore, Bermuda, and St. Helena.

Malta now possesses an infantry Militia regiment in addition to the Fencible Artillery, and an attempt is being made to raise similar regiments in Bermuda and St. Helena.

In view of the great importance which I attach to the matter, I would repeat that in every probability the above garrisons would have to stand as they are during any great war in which we might be engaged, at any rate during the first and most critical period of such a war.

Egypt and Cyprus.

The military occupation of Egypt and Cyprus is a political rather than a military matter.

The climate of Egypt, however, which is trying to Europeans during half the year, causes an additional strain on our young regiments; and the probability of our continued occupation must be con-

sidered with reference to the desirability of raising the age of our soldiers serving with the colours.

VI. Concluding Remarks.

1. In the foregoing pages I have endeavoured to make suggestions for the improvement of nearly all the different forces of the Crown. Where no suggestion is made, it is to be understood that no material changes are considered necessary: improvement is always possible, for even where perfection is occasionally arrived at, the advance of military science constantly gives room for development.

The main principle insisted on is that efficiency is the first requisite: it is more important than the formation of Reserves, important as they are, and without it, numbers are useless.

While, however, making such proposals as would, I believe, add to the efficiency of our army, I have avoided the suggestion of measures which would add largely to our expenditure, feeling that such measures would never be adopted, and that, consequently, it is lost labour to put them forward.

2. It will be seen that for the safety of Great Britain I strongly urge such a modification of our present system as will give us a Regular army and Militia adequate for the defence of the country, in place of the boy-regiments which we now have, which are confessedly unfit for service. With the possibility, however faint, of a sudden attack, it is madness to rely on such regiments. The Reserve may become smaller for a time, but, after all, the Reserve should come second in importance to the army and should supplement the latter, not take its place.

3. But little has been said in the essay concerning the organization of the British troops in India, with regard to whether they should serve permanently in that country or be relieved periodically by units from home. I believe that the latter system is the better from every point of view, and that even if it were not, a sufficient number of men could not now be got to serve permanently in India unless induced by a large increase of pay. India could not afford to give this increase.

4. It is considered that we should be able, after providing for the safety of the country, to employ two army corps on the Continent, or, if attacked in India, to reinforce our army there by that force. The Commander-in-Chief, however, does not believe that this could now be done, and I venture to express my belief that this shows that our present system requires modification.

Every effort is being made to complete the organization and equipment of four army corps and as many brigades of cavalry; but, except as regards one army corps, everything is far from a state of readiness.

5. The army, like the navy, suffers from a want of continuous system, in consequence of the changes of policy brought about by every change of Government; it is past explaining to soldiers how the nation complacently allows naval and military expenditure to

wax or wane in accordance with the principles of the party in power, although the danger of war becomes more imminent yearly as the Continental nations find the burden of preparation becoming heavier and heavier.

When the storm bursts, party cries will no longer be heard, but the day for preparation will then have gone by.

All Powers but England have put their house in order; "the strong men armed" fear no attack and invite none. It is a blow to our national pride to say that we can take a lesson in patriotism from France or Germany, but so, alas! it is.

When the War Minister in those countries rises in his place and announces that such a measure is necessary, and that the cost will be so much, the thing is done.

How different from the conduct of our political parties, where even the more spirited of them increase the national insurance expenditure with the utmost reluctance and timidity, and the other puts forward promises of reductions and parsimony as one of its strongest claims to the confidence of the richest nation that the world has ever seen!

Steam may not literally have bridged the Channel, but we no longer can look on the narrow seas as a complete safeguard. Our navy cannot be too strong, and no true soldier would wish a penny to be diverted from its needs to those of the army; but I believe that those who consider the matter will agree with me, weakly as I have put my case, that our present state of disorganization and unpreparedness at home invites disaster, and that the Minister who gives us again an efficient Regular army and Militia will deserve the eternal gratitude of the nation.

WORKS CONSULTED.

Official publications and Parliamentary papers.
"Imperial Defence," by Dilke and Wilkinson.
"The British Army, 1892."
"Defence of Australia," Lecture by Major-General Tulloch, C.B.
"Journal of the Royal United Service Institution."

Wednesday, March 15, 1893.

GENERAL SIR DONALD M. STEWART, BART., G.C.B., G.C.S.I., &c., in the Chair.

THE ART OF MARCHING.

By Colonel E. T. H. HUTTON, A.D.C. to the Queen, p.s.c., h.p., King's Royal Rifles, late Commanding Mounted Infantry.

"The secret of war lies in the legs."—GENERAL FOY.
("History of the Peninsular War under Napoleon.")

"Let me see two armies on the march, and I believe I could tell you the respective value of each."—LORD WOLSELEY. ("Soldier's Pocket Book.")

"Si l'on classe les connaissances militaires relativement à leur degré d'importance, les marches sont incontestablement la partie la plus essentielle du grand art de la guerre."—DE TERNAY. ("Traité de Tactique.")

IT was with considerable reluctance that I accepted the invitation of the Council of this Institution to read a paper upon the important subject before us this afternoon.

I am deeply conscious of my inadequate ability to deal with the various aspects of military marching in a manner worthy of its importance, and with a treatment suited to the experience and to the matured ability of the audience which is always to be found in this lecture hall. To deal adequately with a subject of such importance would entail a close study of the past military history of all nations and of all times, as well as a close research, for which I have not the time at my disposal this afternoon. My intention will be, therefore, to confine myself to the purely practical aspect of marching. In common with many other officers, I venture to think that the instruction of our troops in this most important branch of their training has not received the attention which it deserves, and it is with this especial object that I shall venture to submit to your consideration the following remarks.

The points which I shall endeavour to make, and the observations which I shall submit, are conceived with a view to suggest ideas, and to elicit the knowledge and experience of those among the audience who have had still larger and more varied experience than myself.

I feel that less of an apology is due from me to those present who are now serving in any branch of our national military forces, as they and I must alike feel that the training and the instruction of the men whom

we lead is the primary duty of all of us, whether in the Regular army with our ever-changing floods of recruits, or in that great military school for our civil population which we understand by the Militia and Volunteer armies. The last twelve years of my service having been almost entirely devoted to the practical training of men for active service, and for active service only, *i.e.*, for war—in contradistinction to mere parade and display—of which marching comprises one of the, if not the, most important elements, I know by personal experience the extreme difficulties and the worries incidental to the incessant instruction and training of soldiers, which are felt by all regimental officers. Having also had ample opportunity of recognising the earnest and anxious zeal which characterizes those responsible for the efficiency of our young regiments and battalions, I shall be proud indeed if I shall be able to make a suggestion, or bring to light a fact, which may assist them, or in any way contribute to an improvement in that most important duty of the soldier, viz., his power of marching. Far be it from me to lead any one to suppose that instruction in this particular has been neglected; the most that I wish inferred is, that what instruction is given might be improved, methodized, and enlarged upon to the increased efficiency of the Service generally. Whether or no I am justified in so doing will be for my audience to judge.

Following the line thus indicated, I will divide my subject into—

I. Tactical Marching.
II. Strategical Marching.

I. Tactical Marching.

Tactical marching may be said to mean: firstly, the marching and manœuvring of troops when in front of, or in close proximity to the enemy; and, secondly, the changes of formation requisite for the placing of bodies of troops in position for delivering an attack, or of defending a position. It is obvious that for such we require extreme steadiness or discipline, quickness, and precision of movement, so as to enable masses of men to be worked and manœuvred under the trying conditions of an enemy's fire at long range and with smokeless powder, modern conditions which in the future must prove trying to young troops beyond all precedent in war. In order to ensure troops being capable of being thus effectively handled, the most assiduous care and attention to details of time, distance, and drill are necessary. The importance that is attached to this portion of the soldier's training is patent to all of us. We know that the efficiency of a regiment, the capabilities of the officers, and the soldierly bearing of their men are gauged for the most part by their parade movements, and by the facility and precision of their battle formations. Every one who has commanded men in action and in the critical moments of the field of battle, knows the absolute importance of the steadiness of the men upon all occasions when under fire—steadiness which can only be ensured by careful preparation on the drill ground during peace. More than ever do we now require a quiet steady discipline,

which must be a second nature to men when the moment of trial comes during the excitement of a general action. This discipline is the primary lesson learnt upon the drill ground, and is the essence of "tactical marching."

A glance at the Infantry Drill Book of 1889, or the Provisional Drill Book of 1892, will show the very great importance justly ascribed to this portion of the soldier's training. In the one case 503 pages out of 508 are devoted to the drill, ceremonial, and battle formations of infantry, and in the latter 257 out of 260, or practically the whole of each book. In the Cavalry Regulations of 1892 we have three volumes having a total of 662 pages, which, with the exception of five pages in the third volume, are exclusively devoted to the same subjects, important as they doubtless are, viz., equitation, foot drill, mounted drill, ceremonial, and battle formations.

It is obvious then to all how much importance is attached to the proficiency of the soldier in all that pertains to his *rôle* upon the field of battle, and how careful are the rules for his instruction, and for his guidance in face of the enemy. No one will gainsay either the vast improvement which has taken place in the training and in the discipline of our troops, apart from that of parade and of display, which has followed upon the introduction of the company and squadron system of training. These are facts well known to those who have served recently with the troops in the field, or who are acquainted with the present, as compared with the past, conditions of discipline and subordination in our army; but I submit that we hardly realize sufficiently how seldom tactics alone, independent of superior numbers, armament, or quality of troops, determine the result of a campaign. Many campaigns are, as we know, decided by marching alone, and almost without fighting. It was the marching power of the Germans which brought together the numbers that overwhelmed the French in the great battles of 1870; it was numbers, even more than tactics or the needle-gun, which brought about the defeat of the Austrians at Sadowa. Even at Waterloo, Napoleon and his hardened confident troops were powerless against the overpowering numbers brought against him on the arrival of the Prussians, by their long and dogged tramp through the muddy lanes of the Dyle Valley. Rarely could even Napoleon's genius turn the tables on the battle-field when the numbers were against him. Again, the casualties arising from the marches, the "strategical marches" incidental to great strategical combinations, often exceed those of a battle. "Therefore, from the point of view of economy of life," says an English military writer, "the march requires as careful study as the battle." The wastage of men and horses has been estimated at 2 to 3 per cent. per 100 miles, and under unfavourable conditions this percentage may be indefinitely increased.

We must be prepared to admit that the acquisition of the "art of *tactical* marching," synonymous with drill and manœuvre, monopolizes almost exclusively our attention, in so far as the training of our men and horses is concerned, and it is to this consideration in conjunction with what follows, that I would especially invite your attention.

The old Musketry Regulations of the Army not long since contained the statement, "that the man who could not shoot was an incumbrance to the battalion." Surely if such a statement were ever true of "shooting," it must be doubly true of "marching," inasmuch as a man or a regiment, who or which cannot march, cannot be expected to be brought into a position where he or it can shoot, be it well or ill, and he or it must consequently be an even greater incumbrance. However this may be, we must allow that while parade marching, drill, shooting, bridging, and a variety of other useful forms of instruction are part of the curriculum of a soldier's training, whether cavalry or infantry, the teaching and practice of long distance marching as an art is confined to a few route marches oft-times perfunctorily performed during the winter months when officers and men are for the most part on leave or furlough; while in the Militia or Volunteer regiments this portion of a soldier's duty yields almost entirely to tactical drill, marching, and manœuvre.

We devote our energies almost entirely to the end, neglecting to a great extent the means to that end. "Le combat est le but," writes the great French authority, General Lewal; "la marche est le moyen d'y arriver."

"Europe has witnessed the celerity of our strategical and tactical movements, and it has been panic-stricken: for the *secret of war lies in the legs*," wrote one of the ablest of the great Napoleon's Generals with reference to the sweep of the Grande Armée from Boulogne across Europe, and the capitulation of the Austrians at Ulm rendered inevitable thereby.

II. Strategical Marching.

I will subdivide this portion of my subject into two heads, one only of which do I intend to press upon your attention to-day, viz.:—

a. "The science," or the "logistique," as it has been called, of marching.

b. "The art of marching" *i.e.*, the art of moving troops over large areas by roads, &c., for purposes of military combinations, and of the training pertaining thereto.

a. The Science or the Logistique of Marching.—It does not come within the scope of a short paper to deal with so vast and so difficult a subject as that comprised under the head of the science of marching, viz.: the scientific combination of marches, and the calculations of time and distance, by means of which strategical conceptions are worked out.

This is a deep subject, and one more appropriate to the close study and consideration of the Staff of an army, than to that of the officers responsible for the personal instruction and leading of the men. For those who may wish to pursue this part of the subject farther I would commend a close study of Lord Wolseley's "Soldier's Pocket Book," Colonels Clarke and Rothwell's "Staff Duties," being a series of lectures published for use of officers at the Staff College,

Verdy du Vernois' "Studien über Truppen Führung," Lewal's "Conférences sur la Marche d'un Corps d'Armée," the principles of which are now embodied in the French Regulations (viz.: "Service de l'Infanterie en Campagne," and "Service de la Cavalerie en Campagne"), and the latest edition of an "Aide-Mémoire d'un Officier d'État Major," published 1893.

b. The Art of Marching.—The taunt is no new one that the British Army cannot march, and I need hardly recall to your recollection the strictures, the justice or injustice of which it is not material just now to discuss, upon the efficiency of our modern infantry regiments, which made our ears tingle and our cheeks blush with indignation hardly a year ago. "That our marching regiments cannot march is certain. The battalions cannot march, and the regimental officers know it. There are brilliant exceptions, but the rule is as I have stated." So wrote the present Member for Belfast, Mr. Arnold-Forster, in the second letter of a series which appeared in the "Times," at the end of 1891.

It is not my province, nor is it on the face of it necessary to disprove so sweeping, so unfair a charge; I cannot, however, omit to bring home to you a statement which remains to this day unchallenged, and the accuracy of which statistics may very easily be distorted to warrant.

"In the twenty years which have elapsed since the tremendous lesson taught by the overthrow of France," wrote "*Vetus*," in the "Times," in the first of those letters which profoundly stirred the reflecting portion of this country, at the commencement of 1892, "the (military) progress attained in England has been relatively trivial . . . Following the wake of Europe, we have partially modernized our drill books. In artillery we have, with halting steps, traced the path well trodden in advance by other Powers. Only the periodic halts in the march of progress enable the distance of the straggling rear guard to be temporarily diminished. . . . When last year (1890) a body of cavalry was assembled for manœuvres on the Berkshire Downs, it was obvious to all observers that the very elements of real military training were absent. . . . The manœuvres in Hampshire this year (1891) . . . Some battalions proved incapable of accomplishing a short march without leaving a large percentage of their numbers behind. Yet marching is mainly a question of boots properly fitted, and of previous training, that is, of company officers and battalion commanders."

True or false, such is the picture conjured up by the writer of perhaps the most powerful series of letters ever made public upon a national question. "No more masterly and comprehensive criticism has ever been contributed to periodical literature," writes the "Times." It would, therefore, be idle to ignore the impression which these strictures have left upon the public mind, and we should do well to ask ourselves whether in the immediate present we have done all we could for the marching power of our men, or whether we cannot do more for the training of our men in this most important of all soldier's duties, viz.: that of marching. It is not enough to urge

what we *do*, or what we *have done*, let us rather ask ourselves whether we cannot *do more*. It is a sad reflection enough to find that we have not impressed the civilian mind as to the earnestness with which we labour at the training of our men, and the energy which we throw into our profession; it must rest with our consciences as to whether we are maligned or no.

Nothing impresses even a cursory observer more in visiting a Continental army than the earnestness and the persistency with which foreign officers devote themselves to the training of their men. The Continent of Europe is now one vast military school, of which the regimental officers are the teachers. The devotion with which these carry out their daily, continuous, and wearying round of routine instruction requires to be seen to be appreciated. The instruction and training of their men in marching occupies a large share of their attention.

It is manifestly absurd to say that British troops cannot march, and I will not for a moment admit that our regimental officers are one whit behind their Continental *confrères* in the earnest and careful discharge of their duties. Without carrying you back to the days of Marlborough, Wellington, or the earlier campaigns in India, I need but to remind you of Lord Napier's march from Zulla to Magdala in 1867, of Sir Donald Stewart's great march from Kandahar to Kabul, and of Lord Roberts' great and more widely known march from Kabul to Kandahar in 1880 (of which the itinerary is given in Appendix A), the march of the cavalry division from Kassassin to Cairo, including the battle of Tel-el-Kebir in 1882, and the march of the Royal Irish across the desert in 1885 from Korti to the Nile at Gûbat and back in 1885. I will here briefly recapitulate the facts for the benefit of those who may have forgotten the details of each :—

Some Instances of Strategical Marches in Recent Campaigns.

The Abyssinian War, 1867.

Lord Napier and his headquarters left Zulla on the 25th January, 1867, and the whole army reached Magdala on the 13th April following, a distance of over 400 miles in 78 days, including a general action fought at Arogee, and the capture of the stronghold of the Abyssinian King.

"We have accomplished," wrote Mr. Henty, a chronicler of the war from personal knowledge, "a march through a country of fabulous difficulties, destitute of roads, and almost destitute of food." "You have traversed often under a tropical sun, or amidst storms of rain and sleet, 400 miles of mountainous and rugged country," said Lord Napier in his farewell general order to his army, "you have crossed mountains (many steep and precipitous) more than 10,000 feet in altitude." "The remembrance of your privations," he adds, "will pass away quickly; your gallant exploit will live in history!"

The Afghan Campaign, 1879–80.

An army of 7,250 British and native troops, under General Sir Donald Stewart, left Kandahar on the 28th March, 1880, reached Khelat-i-Ghilzai on 6th April, Ghazni the 25th, and Kabul on the 1st May, 1880. Two general actions were fought, one on the 19th April, at Ahmed-Khel, and the other at Urzoo on the 23rd. The march was effected through a hostile, difficult, and previously unknown country, yet the total distance of 320 miles was covered in 35 days, including halts, &c., giving a general average of 9·1 miles per diem.

Again, 10,000 men, under General Lord Roberts, left Kabul on the 8th August, 1880, and reached Kandahar on the 31st of the same month, fighting a general action on the following day. This march, carried out over the same route as that of Sir Donald Stewart's force, but in the hottest time of the year, was effected in 24 days, inclusive of halts, giving an average of 13·3 miles per diem, or of 14·5 miles for the days of actual marching.

Egyptian War, 1882.

The cavalry division, including horse artillery guns, and a small force of mounted infantry, under the command of Lieutenant-General Sir D. Drury-Lowe, marched with the rest of Lord Wolseley's army from Kassassin, at 8 P.M., the 12th September, and, continuing through the night, took part at daybreak in the battle of Tel-el-Kebir. This same force marched again from Tel-el-Kebir almost immediately after the battle, and captured the citadel of Cairo, distant 58 miles, by a *coup de main*, at 8 P.M. on the 14th, thus summarily bringing to an end that short and brilliant campaign.

This march of 70 miles in 48 hours was effected through a hostile and previously unreconnoitred country, and included a long night march of a peculiarly trying character and a general engagement.

Nile Expedition, 1884–85.

Lord Wolseley having decided to reinforce the Desert Column which, after defeating the Mahdi's troops in two engagements, was halted and entrenched upon the Nile near Metammeh, directed the 1st Battalion Royal Irish to cross the desert from Korti to Gubat by forced marches.

The headquarters of the regiment and three companies started, accordingly, upon the 28th January, 1885, and the next three companies on the 31st. The desert presented fair marching ground, as the sand was in most places hard and firm—the weather was very hot by day but the nights were cool. There was little or no water except at Gakdul, and all water for drinking and cooking had to be carried. There was much suffering entailed upon the troops in consequence.

The following itinerary gives the time and distances for the latter three companies as far as Gakdul, and for the whole regiment from Gakdul to Gubat and back:—

		Time and date.		Distance.
Korti	(dep.)	10 A.M.	January 31, 1885	100 miles.
Gakdul	(arr.)	9 „	February 5, 1885	
Halt			„ 6, 1885	
Gakdul	(dep.)	4 „	„ 7, 1885	52 miles.
Abu-Klea	(arr.)	9 „	„ 10, 1885	
	(dep.)	3 P.M.		
Gubat.....	(arr.)	say 10 A.M.	„ 11, 1885.	21 miles.

Thus the distance from Korti to Gakdul was made in 119 hours, or at the rate of 20·16 miles in 24 hours, and from Gakdul to Gubat in 102 hours, or at the rate of 17·16 miles in 24 hours. The same regiment retired from the Abu-Klea Wells to Gakdul by forced marches in 65 hours, or at the rate of 21·36 miles in 24 hours, as follows, viz. :—

Abu-Klea.....	(dep.)	6 P.M.	February 23	52 miles.
Gakdul.....	(arr.)	11 A.M.	„ 26	

The men marched throughout most of the nights of 23rd—24th and 24th—25th. The strength of the regiment was about 620 all ranks, and the men carried rolled great coats, water bottles filled, and 70 rounds of M.H. ammunition. The remaining kit, consisting of one blanket, one waterproof sheet per man, and a small kit bag for every group of four men, was carried upon camels. One gallon of water per man was nominally allowed, but the allowance really issued, owing to evaporation, was considerably less.

Some Instances of Recent Marches for Training Purposes in Peace.

As examples of what can be effected in peace-time by young soldiers without the excitement of active service, I would merely quote the following:—The first instance is of one of the infantry brigades at Aldershot, the second of a battalion of infantry in Ireland, which has devoted much care and attention to marching during the last three or four years, the third of a march performed by three Horse Artillery batteries for experimental purposes, the fourth and fifth instances of small detached parties of mounted troops.

1st Instance. (An infantry brigade at Aldershot.)—The numbers of men shown present on parade are relatively small, owing to December being the furlough season. Only those marches are quoted in which accurate times and distances were recorded (see p. 629).

2nd Instance.—At the end of last winter, after a series of carefully conducted route marches, a battalion of infantry, now quartered in the south of Ireland, marched upon one occasion 22 miles in full marching order in 9 hours and 35 minutes, including a long halt of about $1\frac{1}{2}$ hours, giving an average of $2\frac{6}{8}$ miles per marching hour; and, upon another, 20 miles without valises in 8 hours 25 minutes, including an hour's halt, giving an average of nearly $2\frac{7}{10}$ miles per hour.

Date.	Numbers on parade.	Dress.[1]	Time taken, including halts.	State of roads.	Distance in miles.[2]	Numbers falling out.
			h. min.		miles fur.	
Dec. 15, 1892..	1,181	M.O.	3 5	No record kept.	11 6	3
Jan. 5, 1893 ..	877	M.O.	4 10	Dry.	13 4	4
Jan. 12, 1893..	1,037	D.O.	5 15	Dry, but very slippery at first.	17 0	2[3,4]
Jan. 20, 1893..	1,501	D.O.	5 20	Road heavy.	17 4	7
Jan. 26, 1893..	1,340	D.O.	5 20	Roads heavy.	18 2	3[3,5]

[1] M.O. = marching order; D.O. drill order.
[2] Distances taken from 2-in. map, with 1 mile added for turnings when over 12 miles; ½ mile when below 12 miles.
[3] Rolled capes, haversacks, water-bottles were carried, weight 18¾ lbs.
[4] One man sprained wrist from fall.
[5] One man who also fell out on 20th, 25 years of age.

This same battalion held, at the end of last year, company marching competitions in marching order, at which the winning company team of one non-commissioned officer and eight men marched 20 miles in 4 hours 37¼ minutes, or at the rate of 4¼ miles per hour.

Note.—It must be borne in mind that the units referred to in the two instances above were small, and that they were unaccompanied by transport; consequently the rate per hour is greater than that usually allowed upon the Continent for marching bodies of troops.

3rd Instance.—At the beginning of 1892 three Horse Artillery batteries made an experimental march from Aldershot to Woolwich and back, 96 miles, in complete service marching order, in 40½ hours. One horse had a slight girth gall. Thus:—

Aldershot	(dep.)	4 A.M. 9th	96 miles.
Woolwich	(arr.)	3.40 P.M.	
	(dep.)	8.30 A.M. 10th	
Aldershot	(arr.)	8.30 P.M.	

Halts were made at Ripley and Clapham.

The following are given as examples of the physical efforts which can be exacted from small bodies of mounted troops without affecting their efficiency and without any unusual effort.

4th Instance.—1. An officer's patrol, selected from a given troop, of the 14th Hussars, consisting of one officer, two non-commissioned officers, and six privates, with one led horse, was ordered to march from Strensall Camp, 7.15 A.M., July 27, 1892, to Bramston on Bridlington Bay, 39 miles, at which place the officer was to make a reconnaissance and sketch, returning as quickly as possible.

This party only received its orders at 6.15 A.M. the same day, and had no previous warning. It reached Bramston at 12.50 P.M., and left again for Strensall, where it arrived by a slightly shorter route (37 miles) at 9.15 P.M.

A total distance of 76 miles was thus covered in 12 hours, including the halt at Bramston of 2 hours and 25 minutes, during which the officer made the required sketch and report.

Average weight on horses' backs, 15 st. 9 lbs.

Casualties, *nil.*

The Commanding Officer of the 14th Hussars states in his report: "That the first small halt took place 20 minutes after starting . . . besides this there were only two other small halts in the journey to Bramston; but to make up for the small amount of halting, the men constantly dismounted and led horses, thereby easing and resting themselves and their horses, and making progress instead of stopping."

5th Instance.—A party selected from the 4th Division (2nd South Lancashire Regiment), No. VI Company, of the Mounted Infantry, provided with cobs, on the 19th November, 1891, made the following march:—

			Men.	Horses.
North Camp	(dep.)	5.15 A.M.	Coffee.	2 lbs. oats and 2 lbs. hay.
Alton (14 miles)	(arr.)	7.55 „	Breakfast.	2 lbs. oats.
	(dep.)	8.40 „		
Winchester (35 miles)..	(arr.)	12.20 P.M.	Dinner.	4 lbs. oats and 2 lbs. hay.
	(dep.)	2.40 „		
Alton (55 miles)	(arr.)	6.17 „		Gruel, ¼ lb. oatmeal in
	(dep.)	6.37 „		*half a bucket of luke-* warm water.
North Camp	(arr.)	9.15 „	Supper.	4 lbs. oats and 4 lbs. hay.

Distance, 69¾ miles. Time, 16 hours, inclusive of halts.

Casualties—One cob fell and injured one knee slightly.

The men carried the magazine rifle with experimental rifle sling and bandolier waistbelt, holding forty rounds cordite ammunition, haversack, and water-bottle—average weight of man, accoutrements, and saddlery, about 14 st.

The cobs averaged 14½ hands, and were equipped with Cape pattern saddles and wallets. Rolled greatcoats were carried strapped over and two horse shoes with forty rounds of ammunition inside the wallets.

6 lbs. of corn were carried in two nosebags, which were strapped close to and upon the fans of the saddle, so as to balance and steady one another.

Great stress was laid upon the party marching on foot and leading their cobs, as in the case of the party of the 14th Hussars, at the regular intervals embodied in the suggestions for marching given hereafter.

The instances which I have given above are the performances in the case of the marches on service, of troops hardened and seasoned, and trained in the school of war, while in the case of the

marches in peace-time, I have merely instanced the isolated performances of certain corps in which particular stress has been laid upon the value of marching. Not one of these instances, however, can be held to be a criterion of the average ability of our home army, Regulars, Militia, and Volunteers, in marching.

The marching value of an army is that of its worst regiments rather than of its best, for we cannot afford to march so as to outmarch our worst regiments, and thus deplete them of their men. It is therefore to improve the average marching power of our men that we must direct our attention.

It is obvious that no calculations can be satisfactorily worked out by a Staff, no matter how efficient, unless some distinct normal rule for marching is laid down, and some general system adopted for general guidance by all branches of an army upon the march, which shall be subject to such modifications as circumstances of climate and of country may render necessary.

"Good spirits, good roads, high training, and favourable weather, on the one hand," writes Colonel Maurice in "War," "and depression, deep mud, storms, and want of marching condition, on the other, are elements that must be taken into account." Clear as it is that such conditions must be borne in mind, it is no less clear, and it is indeed absolutely essential, that we should have a fixed normal system of marching, embodying the principles upon which marches of cavalry and infantry are to be conducted. It is hardly too much to say that such a system is with us an unwritten law, and that we have no clear and defined standard rate or system of long distance or strategical marching for either cavalry or infantry; hence it follows that no calculations with any pretensions to accuracy can be made.

It is with regard to the importance of such a clearly defined marching standard that I wish to invite your attention, in the first place because that, without such a standard, reliable calculations for combined movements of troops on a large scale are impossible, and, in the second place, because there must be some universally recognised system, if we are to train our young soldiers satisfactorily, whether Regulars, Militia, Volunteers, or Yeomanry, with a view to developing their maximum marching power when required to act in large, or even in small units of command.

The rate of marching laid down in the Infantry Drill, 1892, viz., 120 paces of 30 in. per minute, gives a rate of 3 miles 720 yards per hour, or, including 5 minutes' halt, 3 miles 220 yds. per 55 minutes. This pace is obviously too great for the movement of larger units of command than a battalion, or perhaps of a weak brigade without baggage train. It is universally accepted by Continental authorities that the rate for marching under campaigning conditions is 2½ miles per hour, including 5 to 10 minutes' halt.

If we consider the daily march of a large number of men, horses, and wagons, it requires little argument to show that certain fixed principles of march are absolutely necessary. It will not suffice to say that we must be guided by circumstances, and that a preconceived system will unnecessarily fetter individual initiative.

"Ce qui est fait sans principes arretés donne trop de chances au hassard" ("Tactique des trois Armes." Decker). We shall do well then to put on one side "chance," so far as lies in our power. The first quality in a man who knows war is foresight and prearrangement. Let us therefore reduce, so far as possible, the principles which we must all acknowledge, the system which we consider to best represent our requirements, into a normal standard upon which we may base our calculations, and up to which we may train the staying powers of our horses and men. "Cette formation normale," wrote General Lewal, in his "Conférence sur la Marche d'un Corps d'Armée," "est non seulement nécessaire, mais il y aurait danger à agir autrement." It will always be easy to graft upon such a standard the modifications necessitated by times, climate, and local circumstances, but without it we must enter upon a campaign without a recognised system, and without those means to a well regulated system of marching which alone can ensure success to an army.

The French army, learning from the sad experience of 1870 how fatally had been ignored the lessons of the Napoleonic wars in this respect, have a carefully devised standard for marching their cavalry and infantry, and for the training of both in this duty. The Germans and the Austrians have always made a *spécialité* of marching.

French Scale of Marching.—I propose briefly to record here, as material to my object in view, the standard of marching laid down in the French army for cavalry and infantry, the first drawn up by General Gallifet, and the second by General Lewal.

Cavalry :—

Rate of march.—5·6 to 6·2 miles per hour.

Pace.—Alternation of pace, varying according to circumstances, in the proportion of quarter at a walk to three-quarters at a trot to half at a walk and half at a trot.

Distance.—31 to 37 miles per day.

Forced march.—Every officer must be able to cover with his command by the foregoing rules 124 to 180 miles without detriment to the efficiency of his men and horses.

Halts.—The frequency and duration of the halts are regulated according to the object of the march and the distance to be covered.

Cavalry, when marching with infantry, conform in every respect to the routine laid down for the marching of that arm.

Infantry :—

Rate of march.—2·48 miles per hour, including the short halt.

Halts.—A short halt, or "halte horaire," for 10 minutes at the end of 50 minutes' marching. A long halt, or "grande halte," for a light meal when the march extends beyond 4 or 5 hours. A halt of 3 to 4 hours, or "long repos," when a forced march of 24 to 30 miles has to be made.

During the hourly halts, all distances are corrected, and the men pile arms and take off their packs. The halt and the subsequent advance are alike simultaneous, and are made upon a given signal.

Thirteen miles per diem is the average length of march for the infantry.

It will be interesting to record here the words of an officer who accompanied the French army during the manœuvres of 1891, and to note what he says of the effect of the careful standard and elaborate system of training for marching which has been introduced of late years into the French army:—

"The convention and unreality inseparable from all peace manœuvres have less influence upon marches than upon any other operation. Under this head there is nothing but well deserved praise to be given to the astonishing endurance of the men, and the precise organization of the marches. . . . . The march discipline was excellent throughout, all officers keeping their places, and the distances being carefully preserved. Thanks to all these carefully prepared measures, and to the adoption of common sense principles, the marches were an unqualified success throughout the operations. For instance, on the 11th September, the march of the equivalent of an army corps was watched and reported on in detail. There was not a single check during the passage of the troops which took place on one road, and occupied seven and a half hours."

This officer, who is well competent to judge, thus sums up:—

"From these (the foregoing) considerations of the whole system of marching in use in France, one may conclude that the mechanism of the movement of large bodies has been thoroughly studied, and that a solution has been found which, without undue fatigue upon the infantry, fits in well with the employment of large numbers, and the effective action of masses on the battle-field."

It is with great deference, and with no wish to press unduly upon the many older and more experienced officers whom I see around me the details of a normal standard for long distance marching, that I have ventured to suggest for your consideration the following tables and remarks. These embody the fundamental principles upon which alone all military authorities seem to agree in thinking that the real value of an army must depend.

Proposed Normal Scale of Long Distance or Strategical Marching.

Cavalry.

Before submitting to you a normal scale for long distance marching of cavalry, I would preface my suggestions by inviting your attention to the rate of march indicated in the third volume of Cavalry Drill, page 643. The rate of 5 miles per hour is there laid down as that upon which calculations for cavalry marching are to be based. This rate no doubt includes all halts, and is presumably to be considered the average rate for an ordinary day's march of 24 miles. The alternation of pace, however, at which this rate is to be carried out would appear to be in the proportion of at least half trot to half walk, which would necessitate a considerable increase of speed from that of 5 miles per hour. Thus:—

	Time, minutes.	Distance, miles.	yds.
Trot, at 8 miles per hour....	30	4	0
Walk, at 4 miles per hour ..	25	1	1,173
Halt	5	..	
Total	60	5	1,173

The following normal scale has been drawn up, and based upon the practical experience of marching, and will be found to vary but little from that in use in the French army.

First Hour.

Start—
Trot.... 10
Walk .. 5
Trot.... 15
} 30 minutes = $3\frac{3}{4}$ miles.
Halt.... 5 } Tighten girths, look over saddles, shoes, &c.
March on foot .. 10
Trot.... 10
Walk .. 5
} 30 minutes = $2\frac{1}{4}$ miles.

Second Hour.

Trot.... 15
Halt.... 5
March on foot .. 10
} 30 minutes = $2\frac{1}{4}$ miles.
Trot.... 10
Walk .. 5
Trot.... 10
Walk .. 5
} 30 „ = $3\frac{3}{4}$ miles.

Halt for half an hour and small feed.

24 miles will thus be covered in $4\frac{1}{2}$ hours, or at the rate of 5·3 miles per hour.

The variations of the marching must be adapted to circumstances, such as state of the roads, the physical nature of the country, and the condition of the horses; but the general principles indicated above in the routine for marching should invariably be observed.

The average rate of marching, including short halt, should be 6 miles an hour; there should be half an hour's halt after every 2 hours' marching. In a prolonged march, after 4 hours the horses should be fed, and the men have dinners, or a meal of bread and cheese.

The trot is calculated in accordance with the existing Cavalry Regulations for Tactical Marching at 8 miles per hour, or 235 yds. per minute, and the walk at 117 yds. per minute, or 4 miles per hour.

Officers should mark beforehand upon their maps the points on the road which the parties under their charge should reach at the end of each hour, and so far as is possible arrange for the prolonged

halts to take place at suitable places on or near the road. By these means accurate time can be kept in covering long distances, and an evenness of pace, with proportionate distance, is insured.

Marching on Foot—Halts.—In every hour there should be a halt of about 5 minutes, and the men should dismount and lead for 10 minutes; by this means the horse is relieved of the weight of the man and his arms for a quarter of an hour in each hour, and the free circulation of blood is thus allowed into the skin of the back under the saddle, one of the surest preventatives of sore backs.

In marching on foot the bridoon reins should be passed over, and the horses led in half sections, the men on the inside of their horses, and the horses close to the outer edge of the road, on either side; stirrups and leathers being crossed over the flap of the saddle. The rate of marching should be at least 4 miles an hour, and the horses and men kept locked up.

Feeding and Watering.—Horses' stomachs are small in proportion to the size of their bodies and their food requirements; it is therefore most advisable that, if possible, at each prolonged (*i.e.*, half hour's) halt they should be first watered, and then, if possible, a small feed (not more than 2 lbs. corn or a little hay) should be given. In tropical climates, or hot weather, the nostrils and mouth should be wiped and moistened with a wet sponge kept for that purpose in the wallet when it is impracticable to water.

There is no operation which requires more care, attention, and forethought than the watering of a considerable number of horses. A careful and organized arrangement for watering must be made before the arrival of the column, or horses will be badly watered, and much valuable time lost.

Upon approaching the proposed watering place, an officer should invariably be sent forward to ascertain the most suitable means for watering, and the formation best adapted to the situation before the arrival of the column.

A canvas bucket has been proposed as a part of the cavalry soldier's equipment, and is universal in the French cavalry, which enormously facilitates the watering, and enables horses to be watered more rapidly, and without regard to the approaches to, or situation of, the watering place.

Every opportunity should be taken during a march of allowing horses to graze or nibble grass during the short halts. Horses should be watered slightly whenever possible, care being taken that they are not watered immediately after being fed.

General Remarks.—Constant supervision on the part of officers and sergeants, with incessant attention on the side of the men, are necessary to avoid casualties to horses and men from sore backs, injuries, or weariness.

Columns must preserve their distance accurately, and the greatest care must be observed in regulating the pace according to the facilities or otherwise of the road. Turning corners, going up or down hill, passing obstacles or obstructions, are fruitful causes of loss of distance, and consequent increase of pace by those in rear, unless the

most anxious care and attention are devoted to the corresponding alteration of pace necessary by the leading portion of the column.

When possible the column should be in half-sections, each man upon the outside of the road, thus allowing the officers to pass freely up or down the column, and giving passage to traffic between the files.

The four most important points for officers to note when marching with their men are—

a. That each man sits square and steady on his horse.
b. That no man quits his stirrups, and that, when trotting, each man rises in his stirrups, leaning slightly forward.
c. That no buckle, strap, or portion of the rolled blanket touches the ridge bone of the horse behind, and that the front arch is well above the crest and withers in front, and that no strap or article which may chafe or injure be allowed to get under the saddle.
d. That the saddle is properly girthed up, and does not oscillate.

Horses are to be ridden on all four reins or upon the bridoon only, but they are to be made to "ride" up to their bits either at a walk or at a trot.

At the trot each man should rise in his stirrups, always throwing the weight of his body forward. The weight of the body should be almost entirely supported by the knees and thighs pressing against the horse's side, and by the feet resting in the stirrups. In this manner the weight of the body being hardly ever upon the seat of the saddle, is borne by the side bars. The weight is thus supported by the ribs of the horse, and the possibility of injuring the ridge bone is minimized. Men are not permitted, under any circumstances, to quit their stirrups.

This system of riding, though tacitly admitted and generally practised, is not acknowledged in any regulations that the writer is aware of. The importance of some definite rules upon so vitally important a detail is much felt.

Rear-Guard.—There will invariably be an officer, a non-commissioned officer, and one or more farriers, who will form a rear-guard to all columns. This officer will be in charge of, and be responsible for, all men and horses who fall out or lose shoes. He will insure that men falling out do not attempt to rejoin their troops, but remain in rear of the column until the next halt.

Men whose horses require to be re-shod, or who for any cause are compelled to fall out and remain behind, will rejoin the rear-guard at a steady trot.

Artillery.

The rate of march and the routine to be observed are clearly laid down in the R.A. Drill, vol. ii, p. 252, *et seq.* These instructions are here recapitulated and tabulated for comparison with those suggested for cavalry and infantry.

First Hour.

Start—

Walk	30 minutes	= 4 miles.
Halt	10 „	
Walk and Trot ..	20 „	

Second Hour.

Walk and Trot ..	30 minutes	= 4 miles.
Halt	10 „	
Walk and Trot ..	20 „	

Rate of march 4 miles per hour.

The length of an ordinary day's march is laid down as from 15 to 20 miles.

In a more than ordinarily long march, a halt of an hour is directed, with a little water and hay or grass.

The directions, clear and precise as they are, appear to be framed solely with a view to artillery on the march by themselves, and without reference to the other arms. It is obvious that 4 miles is far too rapid for the march of artillery moving with infantry, as it is also too slow for horse artillery moving with cavalry.

It would appear desirable, therefore, to make it clear that artillery must conform its rate of march to that of the arm with which it is for the time being associated, and that it must adhere exactly to the routine of march laid down for that arm.

Infantry.

The rate of marching laid down in the Infantry Drill is at the rate of 3 miles 720 yds. per hour, or 100 yds. per minute, exclusive of a halt of 5 minutes per hour. The Cavalry Drill, Vol. III, p. 577, assumes the rate of infantry marching to be 3 miles per hour, but in the absence of any precise instructions it must be assumed that the rate of long distance marches is as laid down for manœuvre marching, which would give, including 5 minutes' halt, a distance of 3 miles 220 yds. per hour.

This rate of march is considered by Continental authorities to be far beyond the capabilities of ordinary troops, except, perhaps, when moving in small bodies, without baggage columns and lightly equipped.

The French, who have the tradition of being the best marchers in Europe, lay down in precise form the rate of march for their infantry at 5 kilometres or 2·48 miles per hour, including 10 minutes' halt, giving, therefore, 2·48 miles in 50 minutes, or 87·5 yds. per minute. The Chasseurs Alpins—the pick of the French infantry and who take special pride in their marching powers—march at the rate of 5 kilometres or 3·1 miles per hour, including 10 minutes' halt, or 3·1 miles in 50 minutes.

I have in the following routine, therefore, taken $2\frac{1}{2}$ miles as the standard long distance marching rate for our infantry, which is rather more than that laid down in Lord Wolseley's Pocket Book, in Sir George Colley's paper on "Marches," and in the French Regulations, when considerable bodies of troops are involved.

Start—

First Hour.

March, 30 minutes
Halt, 5 „
March, 20 „
Halt, 5 „
} = $2\frac{1}{2}$ miles.

Second Hour.

March, 50 minutes
Halt, 10 „
} = $2\frac{1}{2}$ miles.

Third and fourth hours same as second.

If the march exceed 5 hours or $12\frac{1}{2}$ miles, a halt of 1 to $1\frac{1}{2}$ hours should be made at two-thirds of the distance; if the march exceed 7 hours or $17\frac{1}{2}$ miles, a prolonged halt of 2 to 3 hours should be made for a meal.

The ordinary march should be reckoned at 13 miles.

It may interest the audience to note Appendix D, which gives the number of marches and average rate per diem for all the principal campaigns from 1796 to 1866.

The usual rate $2\frac{1}{2}$ miles per hour includes 10 minutes' halt.

The distances should be rigorously maintained, and the halts with subsequent advances made simultaneously by the whole force.

The duration of the halts is somewhat lengthened from that laid down in the Infantry Drill in order to allow time for the distances to be corrected, valises to be removed, and arms to be piled. The French find that five minutes will not suffice for this operation.

Special care must be taken in turning corners, going down or up hill, passing obstacles, &c., to prevent loss of distance.

Officers, remaining constantly in their places, must be incessant in their attention to their men.

In the foregoing routine suggested for infantry long distance marching it is naturally assumed that the troops are in marching order with the regulation amount of ammunition, &c.

Training.

It is obviously impracticable in discussing a routine which shall embrace only given principles to consider the changes which would be necessitated for marching in such countries as India, Afghanistan, West Africa, South Africa, Egypt, North America, &c. The writer wishes only to suggest some standard for general use founded upon acknowledged principles which can be adapted to local circumstances, but which at the same time will be a basis upon which to frame calculations, and to found a regular system of instruction.

It is obvious that the given rate of marching may be slightly increased in the case of smaller bodies of troops, but the normal standard suggested above seems to be that which should govern all calculations and all training.

It is obvious that long and continuous marching, whether by infantry or cavalry, can only be successfully undertaken after the most careful preparation and training, and when once this training has been carried out, most truly marvellous results have been achieved. The account and detail of one of the most remarkable marches accomplished by cavalry in modern wars will be found in Appendix B. For those interested in the staying powers and endurance of single horsemen, the detail of the celebrated ride of Lieutenant of Cossacks Peschkoff will also be found in Appendix C.

The training of men for marching is a question which must be largely governed by circumstances and local conditions. A scheme for developing the marching powers of soldiers which would be applicable to troops serving in one part of the United Kingdom will not be practicable for troops serving in another. It is only possible, therefore, to indicate the general principles of training for general guidance, leaving the details of alteration to suit local requirements entirely in the hands of those personally responsible for the efficiency of their units of command. A sufficiently high standard would soon be insured, were it understood that the standard of excellence of a regiment, whether of cavalry or infantry, would be gauged by an inspecting General, not only for its proficiency in drill or manœuvre, shooting, or good conduct, but also for its proficiency in marching long distances without detriment to the efficiency of its horses or men.

"The subject (of marching) is one, which, though much discussed, is little practised in our Service," says Colonel Tyler, R.A., in a short but valuable paper contributed by him to the R.A. Institute Journal, vol. xv, entitled "Time, Pace, and Speed."

The same authority says, "Our officers and men do not know what can be accomplished when the supreme moment arrives, and I cannot but think it would be of great advantage to the Service if such trials (*i.e.*, of long-distance marching) were made part of the annual course, and that batteries should be called upon to perform a march as a part of their inspection . . . . a better idea could be formed of the condition of the horses and the fitness of the battery for service than can be arrived at under the present system of parades."

I submit that the training in marching should be carried out in as regular and systematic a manner as the training in drill, in equitation, and in musketry, and that regulations upon this subject should be equally clear and comprehensive in the principles laid down for general guidance.

It would be obviously impracticable to lay down a hard-and-fast scheme which would apply equally to troops quartered in the middle of Sheffield or Manchester, to those encamped at the Curragh or Aldershot, to regiments in garrison at Malta or Aden, and to regiments at Pieter Maritzburg or Jamaica, to Volunteer regiments

having their headquarters situated in a densely populated portion of this city, or to a country corps distributed over a large area. I am, moreover, one of those who would leave the training of men in these matters entirely in the hands of the company and regimental Commanders, knowing from experience that the more the responsibility of command is diffused, the higher is the standard of excellence attained, whether in drill, in discipline, or in marching.

I will, however, describe the system adopted by the Chasseurs Alpins, the Chasseurs de Vincennes of the Empire, which, serving as these troops do under more or less similar conditions to the rest of the French army, may, at least in principle, be considered as general.

The yearly training in marching commences for the recruits in April, concurrently with the instructional marching for the 2nd and 3rd year men. The course begins by two marches per week of 20 km. each, or 12½ miles, with knapsack empty and without blanket, great coat, or *tente d'abri*. This is gradually increased to three marches per week of 30 km., or 18 miles, with blanket and partial kit, which by August is further increased to four marches per week of 40 km., or 25 miles, with marching order kit and equipment.

The training is in the first instance carried out entirely by companies, then by battalions, and in August by regiments, until the brigade manœuvres in September.

It may be noted that, whereas the French infantry of the line carry 60 lbs. in all, the chasseurs carry 80 lbs.

The routine for marching is exactly similar to that laid down in the regulations, except that the chasseurs march when acting alone 5 km., or 3·1 miles per hour, and consider 18 miles an average day's march.

In the Austrian army, also, a systematic course of training in marching is carried out yearly during the months immediately preceding the manœuvres in the autumn. The German army has also a similar system, and devotes especial care to the training of their men in "strategical" marching. It is, however, questionable whether any Continental army has devoted so much care and attention to the training of their men in a definite system of marching as the French have during the last ten years.

It is very certain that the isolated efforts of teams of men engaged in marching competitions can do no more towards the improvement of the average marching value of an army than do football matches towards improving the average physique of the nation. At best such competitions can only train a selected few to march under conditions impossible for general adoption, and still less possible for active service. We know only too well the abuses which inter-regimental contests, whether in shooting or in football, often lead to. We shall, believe me, gentlemen, do far more good by considering how to raise the average marching value of our various regiments and battalions, than by directing our attention to the thews and sinews of a small number of athletes supposed to represent the marching powers of our respective corps.

Summary.

My endeavour to-day has been :—

1. To draw attention to the importance of marching generally.

2. To show the strictures under which the marching capacity of our army now lies.

3. To show the importance of a carefully devised normal standard for marching.

4. To demonstrate the paramount importance of careful training in this particular duty under some definite scheme, arranged with regard to local circumstances.

I have not attempted in my paper, already too long, to enter into the question of weight to be carried, or to the best form of dress and equipment necessary. The Regulations supply us with this information; we have the materials given us, and we must be content to utilize them for the fashioning of our military machine.

Military dress and equipment, like military tactics in war, have no finality. Change as may our dress, conform to long-range fire and smokeless powder as may our system of tactics, the marching value of our army is an unchanging quantity; it is to the importance of this subject that I invite your anxious interest and study.

I hold it to be the bounden duty of each officer to do what lies in his power for the benefit of the army at large, and it is solely with this motive that I am to-day submitting to you the result of many years of practical experience, and of careful consideration and study of this particular subject.

I believe the British soldier to be the best fighting man in the world—to be capable of anything—and if he fail in marching power, it will be because he has been trained under a vicious system. "Men in the mass are much what a system makes them." Take a thousand Englishmen haphazard out of the street, place them untrained, indifferently fed, and badly led, in face of an active enemy, and you will soon have a dangerous mob. Take the same mob and place them in opposite conditions, let them be taught to obey authority, be carefully trained, be adequately fed, have confidence in their officers, and "in due time you shall fly a bit of bunting in front of them, and bid them march, aye even into the jaws of death," and they will do it!—yes, do it, as they have done it before!

Appendix A.

Itinerary of March of Force under General Lord Roberts, &c., Afghan Campaign, 1880.

Column of 10,000 men of all arms.

Aug.	8. Bala Hissar to Charasiab	8	
,,	9. Charasiab to Zahidabad	10	
,,	10. Zahidabad to Wazir Killa	19	
,,	11. Wazir Killa to Baraki Barak	8	
,,	12. Baraki Barak to Saidabad	18	
,,	13. Saidabad to Takia	8	
,,	14. Takia to Shargas	15	
,,	15. Shargas to Ghazni	14	
		—	100
,,	16. Ghazni to Yergatta	17	
,,	17. Yergatta to Chardeh	16	
,,	18. Chardeh to Karez-i-Obah	15	
,,	19. Karez-i-Obah to Makur	19	
,,	20. Makur to Punjak	19	
,,	21. Punjak to Gajon	16	
,,	22. Gajon to Baba Kazai	17	
,,	23. Baba Kazai to Kelat-i-Ghilzai	17	
		—	236
,,	24. Halt	—	
,,	25. Kelat-i-Ghilzai to Julduk	15	
,,	26. Julduk to Tirandez (Minar)	14½	
,,	27. Tirandez to Shahr-i-Safa	12	
	Cavalry reached Robat.		
,,	28. Shahr-i-Safa to Robat	22½	
,,	29. Halt	—	
,,	30. Robat to Momund	7	
,,	31. Momund to Kandahar	13	
		320	

320 miles in 24 days, inclusive of 2 days' halt, 13·3 miles per diem, or 14·5 miles for each day of marching.

Appendix B.

Account and Itinerary of the Confederate Cavalry Raid, carried out by Major-General J. E. B. Stuart, and styled "The Chambersbury Raid," October 9—13, 1862.

A force of Confederate cavalry, consisting of 1,800 men with six guns, under Major-General J. E. B. Stuart, left Darksville on the afternoon of the 9th October, 1862, and crossed the Potomac on the 10th to the west of the Federal army, reached Chambersburg on the same night, and thence marching in rear of the whole of the Federal army under General McClellan, cut his lines of communica-

tion and spread a general feeling of insecurity and panic throughout the Northern States. This intrepid General finally withdrew the whole of his command across the Potomac on the east of the Federal army, and reached Leesburg at 5 P.M. on the 12th, with the loss only of one man wounded and two missing, having covered a distance of 145 miles in 76 hours. This remarkable march included a feat almost unparalleled in war, for the force, leaving Chambersburg at 9 A.M. on the 11th, reached Emmittsburg at sunset, 31½ miles, and Hyattstown by daylight on the 12th, distant 33½ miles, making a total of 65 miles in 20 hours. "Throughout the whole of the night," writes Major McClellan, Adjutant-General to Major-General J. E. B. Stuart, "the head of his column was kept at a trot, and by daylight on the 12th the advance guard entered Hyattstown, which is 33½ miles from Emmittsburg. Within twenty hours Stuart had marched 65 miles, and had kept up his artillery. Horses for the guns and caissons there were in abundance, and, as fast as one team was broken down, the horses were turned out and others were substituted. Three or four times during the night did the drivers change their horses, and the march was made without delay or interruption." So little had horses or men suffered, that the cavalry of Stuart were again engaged with the enemy four days after the execution of this remarkable raid.

Force.—1,800 cavalry in three brigades, under Brigadier-General Wade Hampton, Colonel W. H. F. Lee, and Colonel W. E. Jones respectively. Four guns, under Major John Pelham.

Date.	Route.	No. of miles.
Oct. 9, 1862.	Darksville to McCoy's Ford, on the Potomac	17
	Bivouac for the night.	
„ 10	McCoy's Ford to Chambersburg	38
	Halted for the night.	
„ 11	Left Chambersburg 9 A.M., and reached Emmittsburg sunset	31½
	Short halt.	
„ 11—12.	Left Emmittsburg soon after sunset, and marching all night reached Hyattstown at daylight, 12th	33½
„ 12	Hyattstown to White's Ford, on the Potomac	15
	Engagement at White's Ford with Federal infantry.	
„ „	White's Ford to Leesburg at 5 P.M.....	10
	Total.....	145

Thus a distance of 145 miles was accomplished in 76 hours, approximately; a portion of that distance, viz., Chambersburg to Hyattstown, 65 miles, being covered in 20 hours. The Federal cavalry were entirely used up in their efforts to overtake the Confederates, while General Stuart, on the other hand, with his same

troopers, was again engaged with the Federal army upon the 16th and following days.

The above data have been extracted from the "Campaigns of Stuart's Cavalry," by H. B. McClellan, and from the "Official Records," vol. xix, part ii, p. 20, *et seq.*

Appendix C.

The following itinerary is added to show the great powers and endurance of a single man and horse in covering enormous distances, in spite of the most unfavourable conditions of climate and roads:—

Ride of Lieutenant of Cossacks Peschkoff, Russian Army.

This officer started from Blagovestchensk, on the Amoor, not far from Vladivostock, upon the 7th November, 1889, and reached St. Petersburg on the 19th May, 1890, viâ Tomsk, Omsk, Perm, Kuran, Nijni Novgorod, and Moscow. He rode one and the same horse throughout the entire distance of 5,400 miles and reached his destination in 193 days, during the depth of a Siberian winter.

Average distance per diem (including 24 days of halt, when Lieutenant Peschkoff was ill), 28 miles.

Average rate per marching hour, 6 miles.

Maximum distance in a day, 56 miles.

Weight of man ..... 9 st.
„ saddle and kit.. 3 st. 12 lbs. } = 12 st. 3 lbs.

Horse was Cossack bred, and only 12 hands 3 in. in height.

The writer is indebted for the above complete details to an account given of this extraordinary performance in the "United States Cavalry Association Journal," of September, 1890.

Appendix D.

Table showing the Marches accomplished by Modern Armies.

Campaigns.	Number of marches.	Greatest march in one day.	Shortest march in one day.	Average length of march per diem.
		miles.	miles.	
Campaign of 1796.....	203	33·5	5·0	15·5
„ 1800.....	135	23·6	2·3	10·6
„ 1805.....	267	29·8	7·4	16·1
„ 1806.....	94	30·4	3·0	15·5
„ 1815.....	20	19·8	6·2	13·7
„ 1859.....	130	19·2	5·0	9·6
„ 1866.....	459	26·0	2·5	14·0

General average march per day, 13·57 miles.

The above table is taken from the "Conférence sur la Marche d'un Corps d'Armée," by Colonel Lewal, of the French Staff. The kilometres in which the original table was made out have been converted into English miles to facilitate reference.

Appendix E.

A few examples of forced marches:—

Forced March. Cavalry.

In 1877-78 a brigade of two regiments of Russian cavalry with a Cossack horse artillery battery marched from Gregoriopol to Odessa, 112 miles, in 3 days. Weather stated to have been boisterous, with drifting snow.

Forced March. Infantry.

In 1806 the French Guard was transported from Paris to Mainz in 5 days, and thence to Bamburg in 8 days: that is to say, a distance of 435 miles in 13 days, about 33 miles a day. This astonishing feat was performed by conveying half the men upon carts with the whole of the knapsacks, while the other half marched.

Again, in the Crown Prince's pursuit of MacMahon's force, 26th to 30th August, 1870, the actual marches averaged 15 to 20 miles a day. The troops were sometimes on the road from 4 A.M. to 8 P.M. In October, 1870, the 18th German Division marched 260 miles in 9 days, an average of nearly 18 miles a day.

Major-General Keith Fraser, C.M.G.: I should like to say a few words on this subject with reference to cavalry. The whole question is such a large one that many books might be written upon it, and discussions might be endless, but there are only a few details which the lecturer mentioned that I should like to refer to. As to the general subject we must all feel that it is one of the greatest possible interest to the army. The Duke of Wellington told us that an army of 10,000 men that can march twenty miles a day has more effect upon a campaign than an army of twenty thousand men that can only march ten miles a day. The greatest importance in foreign armies is no doubt attached to their being able to march. With regard to cavalry, I think that English cavalry has shown fairly well in all campaigns during the present century. The celebrated march of Lord Lake, of seventy miles, in India, with cavalry and horse artillery, fighting a battle at the end of it, showed what can be done; and the same may be said of many marches that took place during the Indian mutiny, and on various other occasions in other parts of the world. The 3rd Dragoon Guards, in Abyssinia, marched to Magdala under the great difficulties which were described by the lecturer, and arrived there with very few casualties, indeed, I believe, without a single sore back. The men led their horses a great part of the way, which has always, I believe, been done by the English cavalry at times on the march, and is no new system at all.[1] With regard to smaller details, of which the lecturer spoke, it is stated in the 3rd volume of the Drill Book that the pace of the trot in marching should be eight miles an hour. Now, I have seen foreign cavalry a great deal, and I have come to the conclusion that eight miles an hour is much too fast to trot on a march. I think that a trot of six miles

[1] The 19th Hussars marched 1,500 miles on Syrian ponies in the Nile Campaign of 1884-85, and only lost twelve horses by disease or fatigue. On one occasion they went seventy hours without water, and on another fifty-six hours.—J. K. F.

an hour is the proper pace. That is the pace they adopt in Austria, and at that pace they can keep up for a great number of miles. It is what they call hounds-pace. I have frequently ridden great distances with them, trotting at a slow, steady pace. The men sit well down, and rise slightly in their stirrups, which, in my private opinion, is the right way to ride. They ride with the double rein. The lecturer speaks of leaning forward. They do not lean forward. They sit with the weight on the centre of the horse, and the result is there are few sore backs. The men ride about twenty-two stone; a great weight; but there are hardly any casualties. The actual pace of marching for cavalry in Austria, and in almost all countries, is five miles an hour. It is found that that cannot be well exceeded, except for forced marching. As to the normal rates of marching, which General de Gallifet has drawn up in France, and from which the lecturer has but slightly differed, I think you cannot lay down hard and fast rules, because so much must depend upon the nature of the roads, whether you have to pass over hills and what sort of country you are going through. It also depends upon what scouting is necessary, because if you have to send out flanking parties you must wait for them, and of course those are the horses that suffer the most. There are also various tables of pace laid down in the French books. There is nothing in our drill book, I admit, but the book is already long enough. Officers can read foreign books, and there are an enormous number on the subject of marching, laying down different rates for forced, rapid, and ordinary marches, which anybody can study. It would be presumption in me to say anything about infantry marching if I had not been a great deal with foreign armies, seeing them both on service and in manœuvres; and having had that experience I must say that marching abroad is studied a great deal more than it is here. There the men carry their packs. I have been accustomed in Austria to see troops marching from Vienna to Brück, a distance of thirty miles, in the months of July or August, carrying packs weighing about 47 lbs.; and I have hardly ever seen a straggler. They do it in a day. At one time they used to do it in two days, but now they do it in a day. He would be a bold man who would take one of our home regiments, the men of which are not drawn from the same agricultural population as the Austrian and Hungarian regiments, and attempt to march from Dublin to the Curragh in a day in hot weather even without packs. I think the lecturer has been rather hard upon Mr. Arnold-Forster for what he has said in his letters to the "Times," because we know that in the Peninsular War the Duke of Wellington frequently found fault with the English infantry not having been practised sufficiently in marching, and he has also said that the French marched much better. I think this has always been our failing, although no doubt the marches which have been mentioned have been brilliant exceptions. I think it would be a good thing if English infantry, when it changes its quarters, could march by road. When I had the honour to command in Ireland, I had to do with some of the finest regiments (without making invidious distinctions) in the Service. Those regiments were not moved about by road. One regiment—a celebrated regiment now at Aldershot, and whose commanding officer has always shown the greatest possible interest in soldiering, and in having his regiment in the highest state of efficiency—was ordered from the Curragh to Fermoy, which is on the railway and also on the road. The regiment went to Newbridge, from Newbridge to Dublin, from Dublin to Kingstown, from Kingstown round to Queenstown in the "Assistance," then from Queenstown to Mallow, and from Mallow to Fermoy, except the cyclists of the regiment, who went by road, and they got there in a very short time. The others were three nights at sea in the "Assistance," not a very popular ship, and I think the men would have very much preferred marching.

Colonel RICHARDSON: There is only one point, upon which the lecturer has laid considerable stress, which I feel a little inclined to take exception to. He holds that the marching power of a man is an unalterable quantity. He means that men in all ages, if I understand him rightly, have marched on their feet carrying more or less weight, and that this cannot be changed. But he did not give us enough information in the lecture to form any opinion as to how much weight carried handicaps marching. I think weight carried makes a very great deal of difference in marching, and it is a question whether, though "Vetus," in the "Times," said we

followed other nations, we could not in that line take a fresh departure altogether and lead. The question is whether loading a man's body with weight is the best way of carrying the weight along. We still go on as porters, in fact, instead of taking a lesson from cyclists, and other machinists who now carry weight mechanically far better than by loading it on a man's back. I believe there is a great need for the carrying of more ammunition, and what we have to consider is, whether a man applying half the power that he now does in carrying weight could not be made to get along the road quicker, conveying a greater weight, and yet come up to the fastest rate of marching that has been given by the lecturer. Instead of doing 2¼ miles an hour, could not the British army be got by science to march with the same ease at four miles an hour, or thereabouts? I think it might be done. I do not think there has been much done in the line of trying to carry weight scientifically. We still load it up upon the soldier's person, as armies of old did. An infantry soldier marching exhibits a very unscientific application of carrying power. The English people are, of all nations, the worst beasts of burden. The English soldier has good endurance and excellent physique and fighting qualities, but he cannot carry weight except for short distances. He can carry enormous weights for short distances, but not for long. In this direction, I believe, science could come in to advance the marching power of the British army.

Lieutenant-General GOODENOUGH, C.B.: I did not rise before, because I was in hopes that some younger men, who are responsible for the carrying out of the training in the manner in which the lecturer has suggested, would have spoken and assisted us with their opinions. The lecturer has alluded to the absence of regulations as regards the cavalry rising in their stirrups; may I presume that he referred to our regulations, because, as to foreign regulations, I am authorized by my neighbour, the French Military Attaché, who has been good enough to come here to-day, to say that in the French regulations the rules as to rising in the stirrups are laid down.

Colonel HUTTON: I was speaking with reference to our regulations.

Lieutenant-General GOODENOUGH: There is one thing in my experience as a General Officer that I should like to remark upon, which is this, that I am persuaded that Commanding Officers very often, having a large number of very young men in their battalions who are unable to perform long marches, assume the attitude of giving it up in despair and of doing nothing. If they are called upon to march or to put in an appearance somewhere at a distance, they talk to themselves in this kind of way: "Oh, I could not appear with one-third or half a regiment. We should make a very bad show, and so I am not going at all." I do not think from my experience that that is the proper way of regarding the subject. The army is a school of training, and officers would do well to accept the situation as they find it, that is to say, if the men are young, to regard the battalion as a school of training. If there are those who are too young to march—I think the lecturer told us that the French begin their marching training not with first year's men, but with second and third years' men (Colonel Hutton assented)—then the same principle should apply here. A General Commanding certainly would not expect to see the whole battalion present at a long route march. He would expect to find the younger men kept back for gradual training, and only the men who were fit and proper brought forward for the longer marches. Instead of the battalions going out in the perfunctory manner to which the lecturer has alluded, they might perfectly well go out in their different classes and categories, or by companies or smaller bodies in different directions, and perform marches of various lengths. That would be the practical way, in my humble opinion, of dealing with the subject.

Mr. CHARLES WILLIAMS: May I venture, as a visitor, to say a word about a march I saw in Bulgaria some eight years ago? I was the only Englishman present at the campaign, and the march struck me as one of the most remarkable that has ever been performed. A battalion of Bulgarian militia left Rustchuk for Sofia on a sudden order, as the Servians had invaded Bulgaria. The distance, as nearly as I can scale it on the Russian Staff Map, is 290 versts, or as nearly as possible 180 miles. The first part of the road is very muddy, so far as it lies in the valley of the Danube. The next part is over the foot hills of the Balkans,

which is pretty dry marching, mostly over sward with a few strips of roads. From Plevna onward the road is very good indeed, except over the Orchanie Pass, and the last 20 miles into Sofia is as good a road as anyone could wish. The men covered the distance in five and a half days. They never had a good sleep, except at Plevna one night for about six hours. They had frequent halts, not determined by distance, but by the villages along the road, at each of which water and a kind of porridge was ready for them. They carried knapsacks, but they were nearly empty. They carried havresacks with some pork and biscuits in them, and most of the men had pushteens, not so elaborate as the Afghan pushteens, but common short sheepskin coats. It was in the beginning of November, and the weather varied very much; it was very moist the first part; sleety and slush the second part; and the last part was a hard frost. The foot gear of the men seemed to answer admirably through all these variations. Each man had a pair of long boots coming up over his knees, made of the Black Sea porpoise skin, but instead of wearing them they slung them at their belts, and each man had felt, something like putties, only covering the feet, strips of felt, three plies of felt, giving entire play to the muscles, and at the same time keeping out the slush and wet, so that the inner layer of felt was always dry, giving full play to the muscles of the feet. It seemed to me that the men slung along the road with great ease and, to use an Irish expression, "iligance." They did not march in good military form: the men straggled a good bit: there were no distances between the companies, and there were no advanced or flanking parties. The merit of the march is the extreme rapidity with which they got over the ground, and after one day's rest in Sofia they started off for the front. They arrived too late for the fighting, but Prince Alexander mentioned them specially in his General Orders for the rapidity with which they got over the ground.[1] I thought it was worth while to mention this thing, because what struck me first about it was the men throwing off their foot gear and marching in the felt bandages, which are common all over the country in winter time.

Colonel BAYLIS: I should like to make a few observations on this most interesting subject, interesting certainly to all the branches of the army, and I think I may say particularly so to the force on which the country relies in the absence of the regulars, that is the Volunteer army. I think the lecturer has made a very pertinent observation when he says that you must not look at what a particular company may do against another company, but you must look to the average. In this important matter the question is, what will be the average marching of the army. I think I may mention to you that my old regiment, the 18th Middlesex Rifle Volunteers, a few weeks ago, having its headquarters at Paddington, did a marching competition which created very much excitement and surprise; the distance was 26½ miles, which the winning team accomplished in 6 hours and 45 minutes. The 2nd and 3rd teams within 15 minutes of that time, while the 4th and 5th were only a few minutes later and tied. Eleven out of the 12 companies sent representative teams of 8 men each, with a sergeant to each team as a leader. Each man carried a weight of about 40 lbs. including his rifle, 40 rounds of ball ammunition, great coat, packed valise, havresack, and water bottle. I was very much struck with the result, and certainly it was a great thing to do; but what is the use of merely a dozen or a hundred men in a regiment marching like that? You want the regiment generally to march, and, as it has been carefully explained by the lecturer, that must be done by continual careful drill and preparation. I remember that it was said to me by Mr. Justice Chitty, who was the umpire of the University racing crews, that the men who suffered were not the University crews in the races, but the scratch crews; when they got together scratch crews and they rushed at it all at once, they suffered very much indeed, and many men came to grief by it. There-

[1] I should have added that another battalion, similarly "shod," marched 96 versts, or 60 miles, in 30 hours, and arrived just in time to go into action at once, turning the scale, which had hitherto inclined towards the Servians, by the use of the bayonet at the battle of Slivnitza.—C. W.

fore you have laid down, what we must all agree with, that to effect good marching throughout the army you must have general training in the best possible mode, and I think the mode which the lecturer has suggested is one which may commend itself to many, and I hope many may take advantage of his advice upon it. I have made these remarks with regard to careful preparation and training generally, but I wish to make one observation with reference to details which the lecturer has not mentioned. A distinguished officer of the 45th Regiment, Colonel Preston, told me of the great advantage of teaching his men to sing on the march. He said a singing regiment would always march further than another regiment. Therefore I think that singing ought to be encouraged as much as possible. Regiments have their bands, but singing keeps up the men's spirits and makes them think less of fatigue, and less of themselves, and more of the object in view. This is specially so where you have two regiments marching one against the other, starting at the same time: the singing regiment will overtake the other because they have good spirits. There is one thing about which I wish to ask a question. I understood when I was at school, reading Xenophon's account of the retreat of the ten thousand Greeks,[1] that they accomplished about 13 miles a day, and I was told that the marching in that retreat had not been exceeded by the average marching even in the present day. I think, Sir, you say that the distance per day should be 11 miles, and the pace 2½ miles an hour; but supposing you wished to keep it up for a great length of time, not merely a spurt, what would be the averages for ordinary continued marching?

Brigade-Surgeon STAPLES: I find great difficulty in asking to say a few words on this subject, because I do not look at it from the point of view of a purely military officer, but chiefly from that of an army Surgeon. I take it the discussion has run to some extent on slightly wrong lines here to-day, and officers have spoken as if marching consisted of nothing else but military pedestrianism, and the walking and trotting of horses, &c. I have done—I won't say anything heroic, but—a fair amount of marching with our army, especially in India, and it appears to me that marching consists of a great deal more than stepping out, and that there are several things that are necessarily part of it, such as tent pitching, the loading of baggage animals, men making themselves handy in bivouac, and proper halting, and so on. And my experience goes to show the absolute necessity of the two chief points that Colonel Hutton insists upon, viz., systematic training, and the necessity for a standard. Distances are not now laid down, and officers, who are always very zealous in getting forward in campaigns, will sometimes, perhaps, press a little heavily on the men, and increase the percentage per 100 miles that falls into the hands of the military Surgeons. I particularly want, however, to examine Colonel Hutton's lecture from the point of view of long distance marching, and we Surgeons are very good spectators, because we are mounted, and can see very well, both metaphorically and literally, where the shoe pinches. We look at it, primarily, from the point of view that marching is very hard labour, being in this regard governed by three main conditions, viz., the weight to be carried, the pace, and the distance, and here again I find myself absolutely concurring with Colonel Hutton in what he has said as to the necessity for a standard. Referring to those interesting marches he has recounted. viz., Sir Donald Stewart's own march from Kandahar to Kabul, Lord Roberts' march from Kabul to Kandahar, and the march of the 18th across the Bayuda desert, I wish to point out, with regard to the important bearing of weight, that on none of these marches was the knapsack carried. The reputation of our army in India is probably above that of any other army, either in ancient or modern times, as regards endurance, and only that I do not wish to detain you here, I could recite marches in that country that would seem almost incredible. I may, however, mention one: I allude to the 43rd marching in the Mutiny from Bangalore to Kalpi, 1,300 miles,[2] equal to from here to the Black

[1] The Greeks marched 1,155 parasangs in 215 days during their retreat.—T. H. B.

[2] "Without metalled roads, across many unbridged rivers, with a long ammunition train of country carts, which had to be dragged up the numerous ghauts that separate the Deccan from the plain of Bhundelcund, and this exertion had to be made in the hottest season of the year."—"History of the 43rd L.I."

Sea, and I may add, that that was only to begin the campaign, in which some of the companies afterwards covered an additional 2,000 miles. If you think of that march for a moment, you may, it appears to me, make yourselves tolerably easy about your detractors in the Press. But it is not necessary, perhaps, to refer at this meeting to the events of the Mutiny. But no doubt officers are here also who were in the Crimea, and they will remember the march to the Alma, and that the pack was not carried in that memorable struggle, nor has it ever been carried, as far as I know, where you have made great strategical marches with your men; therefore, I think it would be necessarily a good reform if the pack were left behind, and I hope I have additional good reasons for what I say. It is the custom in the Medical Department of the army to send Medical Commissioners to foreign armies during war, and to refresh my memory I looked up the campaign of the Germans, in 1866, against Austria, and I find it mentioned, that in their desperate struggles to get through the defiles from Lower Silesia into the plain of Bohemia, the pack was thrown aside and placed in country carts. Many of the regiments did not see it again for thirteen days, and it is said that they were all the better for it, and it is further recorded, on the authority of an officer of high rank,[1] that these men were jollier and in better health than the men who, through want of vehicles, carried their packs. I may say that the rule in the German army is that the pack is laid aside when great marching efforts have to be made by the men, and also that it is taken off when going into action. Colonel Hutton, I am afraid, will rule me out of order on this point by remarking that he has not dealt with it in his paper. I do not, of course, wish to say there was any necessity for him to do so, but yet it is an important one, and one that ought to receive great attention from military men.[2] There is another point about the marching of the German army. No doubt they have marched very well, and, in some of their marches, from Sedan to Paris, for example, they have done 20 to 21 miles a day, equal to what our men did in the Bayuda Desert. Their average, or standard march, is 14 miles, and I ought not to omit to say that they pay great attention to the men's feet with regard to boots; high heels and narrow toes are absolutely eschewed, and they wear no stockings. They have a special way of treating the feet, which I won't go into, but the stockings are put on after the march is over, so that I might improve upon the Colonel's epigram, that the secret of war lies in the legs, and say it is in the feet. But no doubt the "leg," in his view, includes the feet. Colonel Hutton has laid down 2½ miles for the standard march, and I think that can be proved to be absolutely correct. I have often timed the men on the Grand Trunk road in India—a good road—and the average marching of companies was 17 minutes to the mile, or 51 minutes to the hour, allowing 9 minutes for a halt. That was, of course, without the valise equipment, as you now call the knapsack, and without Service ammunition; but if you had the pack and ammunition it would bring the time up to 20 minutes for the mile, and that would be 50 minutes for 2½ miles, and 10 minutes halt within the hour. That is not laid down in any of the books, so that I think there is a great necessity that it should be so, to form a regulation or authoritative standard. I presume Colonel Hutton assumes a fairly good road.

Colonel HUTTON: Favourable conditions.

Brigade-Surgeon STAPLES: As to your proposed distance of 13 miles, I suppose you mean that for a battalion or infantry brigade without heavy guns or ammunition columns, and the light baggage either on the "hoof," as you may say, or in commissariat wagons?

Colonel HUTTON: Certainly.

Brigade-Surgeon STAPLES: Then that is your standard?

Colonel HUTTON: That is the standard.

Brigade-Surgeon STAPLES: Under those circumstances I think it is a very good

---

[1] *Vide* Parkes' "Practical Hygiene."

[2] I inadvertently, with regard to this point, omitted to make reference to our native troops in India. They have gained a deserved reputation for marching, and it is noteworthy that they do not carry, and, I believe, I am correct in saying, they never have carried, packs.—F. L. S.

one; but if you have guns to be dragged up hill, and wheeled country carriages, what should be allowed for the march of a division or army corps? I think you would not do 13, and probably 12, or even 10, will be nearer the average, and, perhaps, for such contingencies, it would be a good thing also to have a standard. I will conclude by mentioning one thing I read the other day. We hear a great deal of the struggle that is to take place between the army of this country and the army of Russia for the Helmund. I suppose not many of us will see that race; but I thought I would mention, in reference to it and our Afghanistan marches, that the Russians, on the road to Khiva, did exactly 10 miles a day. I think we need not be apprehensive that our army will not equal that. I thought these few remarks might add a little additional interest to the lecture, which has been so ably drawn up and discussed from the purely military point of view.

Lieutenant-General Sir CHARLES C. FRASER, V.C., K.C.B.: If I might be permitted to say a word or two on the lecture, it appears to me, that though the lecturer finds fault with Mr. Arnold-Forster, Mr. Arnold-Forster had certain grounds, which soldiers think were very strong, for his remarks. Those who were at the manœuvres in Hampshire must have all applauded highly the spirit of the officers, the non-commissioned officers and private soldiers, and have been delighted with the practical training given to the troops; but those who looked on saw that they were but boys, and their training must be most difficult and discouraging. For the old rules of marching, as laid down, to be brought into play now, is, indeed, a severe task. I commanded the Curragh Camp for four years, and saw the boys that came and went. Let us go back to the old rules. If I might read a word from the orders of the Commander of the Light Division in the Peninsula: "Any man who, for the sake of avoiding water or other bad places, or for any other reason, presumes to step to one side, or quit his proper place in the ranks, must be confined." Those small things are discipline, are they not? which we need very much. If I might say, at the funeral of that Officer Commanding the Light Division, General Crauford, Sir Charles Yorke told the story, that as the men marched from the funeral, so strictly trained were they, that when they came upon some water, they rallied together and pushed through it with a kind of murmuring cheer. That shows the discipline that we want, and I do hope some very strict rules will be laid down with regard to the march both for cavalry and infantry as proposed by the lecturer.

Lieut.-Colonel W. T. DOONER: With reference to what has just been said as to whether the men wore packs in Abyssinia, a General Officer under whom I had the honour of serving commanded his battalion in that expedition, and I remember he was mentioned in despatches by Lord Napier as having won his admiration by the splendid example he had set to his men, and part of that example, I always understood, was that he had marched at the head of his regiment in marching order. This, therefore, may throw some light on the question which has been raised as to whether the men wore their packs in that expedition. There are one or two little points I would like to ask the lecturer. He has quoted from "Vetus" that marching is mainly a question of boots properly fitted, and has given us the example of the French marching so well, doing 25 miles a day; could he kindly tell us what sort of boot they wear when marching? I do not know if many of you have thought about the question of our ammunition boot, but I have some little doubt whether it is the very best we can have, and if the French are able to get 25 miles a day out of their men four days a week, I should think it would be a good thing to investigate closely the exact sort of boots they wear. The gentleman on my left (Mr. Williams) who spoke about Bulgaria, said that the men there marched in putties. That is, I think, a new thing to most of us; and it is difficult to understand how they managed to get along so exceedingly well, because little bits of stone or flint or anything might get in between the puttie and the foot, and would probably cause much discomfort and inconvenience. There is one other matter I would like to refer to about our regulations for marching order. It is directed that 20 per cent. of the men are to carry the spade. The present spade is very inconvenient, and incommodes the men considerably when marching; but it does even more than that, as it spoils their trousers, which is a serious matter to them. I think if some really good spade, some small tool, could be invented, that the men

could carry without inconvenience, it would be a great improvement. I, of course, am not qualified to give an opinion about mounted men quitting the stirrups when on the march, but I would like to mention that I remember well, in the riding school, the riding master told the class I was in that the stirrups were not to prevent our falling off, they were only for the purpose of carrying the weight of our feet and legs, from the knee downwards. Therefore, if that riding master was correct, I cannot see quite why we should not, in order to rest the muscles, &c., take the feet out of the stirrups if we like.

General KEITH FRASER: I might explain about the putties that Mr. Williams has referred to. I was myself a witness of a great deal of the marching at the latter end of the campaign, and I must confess what excellent things they were. It is the natural dress of the country. The puttie is wound entirely round and round the foot several times, and then up the leg, so that nothing can possibly get in. It is the most perfect thing I ever saw for marching in. It has another advantage. The weather was terribly cold, the thermometer being about zero, and great numbers of the men were frost-bitten in the hands, but no man was frost-bitten in his feet.

The CHAIRMAN (General Sir Donald Stewart): I think all military men must admit that Colonel Hutton has hit a blot in our system of training. It is not a question of opinion, it is a question of fact, and I am sure every officer who has had to deal with troops in the field must have seen the mischief of having soft and untrained troops placed under his command. The difference between what I should call a hardened soldier and a soft one is very great. One man struggles along the line of march, comes in weary, is disinclined to exert himself, and is certainly unfit to go on fatigue duty of any kind. Such a man requires time and training to fit him for field work. Our army should always be fit to take the field; no soldier should be regarded as a trained soldier unless he is fit for instant service. Dr. Staples very truly said that it is not usual for British soldiers to carry great weights in India. What is the reason of that? Not that our soldier in India is unable to carry his pack, but because he is such a valuable fighting machine that we cannot afford to let him do anything that injures his fighting powers. But, in point of fact, they generally carry something in India. During the Afghan war we managed to carry most of their kits for them, with the very imperfect transport at our disposal. We did our very best to keep our men fit, but, besides their ammunition, they always had to carry their great-coats, and usually cooked rations in their havresacks, as well as their water-bottles, and not unfrequently they had to drag heavy guns through miles of sand. Though the troops in India are always in fair training, the work of the troops sent into Afghanistan was at first very trying, but few broke down, and in a very short time they were fit for anything. When the troops under General Roberts commenced the march from Kabul to Kandahar they were all as fit as men could be. Considering the season, the marching was excellent. But it was not the marching alone that tried the stamina of the men, it was the work they had to do after they got into camp. Before they had time to rest, men and animals had to scour the country round for food and forage. The column which marched from Kandahar to Kabul under my command covered the distance in very creditable time, although there was no cause for hurry. It was very trying for men and animals, but all were in high training, and they wanted for nothing except food and forage, which were both scarce, and were collected with immense labour. The fatigue work imposed upon the force could only have been performed by men in a high state of training and good physique. I certainly never heard of such a march as that referred to by Mr. Williams. Thirty-three miles a day for five and a half consecutive days by infantry is a splendid feat, and recalls the march of the Guide Corps during the Mutiny, which marched from Hoti Murdan, near Peshawur, to Delhi, 580 miles, in twenty-two days, or at the rate of 26 miles a day, cavalry and infantry together. The infantry had to foot it the whole way. Of course the road was splendid. They had no encumbrances, and they were assisted with a few "Eccas" (a sort of pony gig, carrying two men) and riding camels—a wonderful march under an Indian June sun. Many other marches could be mentioned to show what can be done by trained men and horses. I know a native cavalry regiment that went 117 miles in two days. During the Sutlej campaign, the regi-

ment of which I was Adjutant marched 54 miles in twenty-four hours, with only one straggler. Colonel Hutton has shown us what ought to be done and what can be done, and I hope that our officers will be permitted and enjoined to take the matter of this address to heart, and see that the marching powers of the men serving with the colours are developed to the very utmost. Indeed, no man should be considered a trained soldier who is not capable of performing at least what the soldiers of Continental armies are required to do during their annual manœuvres. Whether our soldiers should or should not carry packs in field service is quite beside the question; that they should be carefully trained to march with a certain amount of kit, no military man can deny, and it is only by such training that they can at all times be fit to take the field. Indeed, no system of training can, in my judgment, be quite satisfactory that does not meet this condition. In conclusion, I hope I may be permitted to express to Colonel Hutton the thanks of this meeting for the clear, lucid, and interesting statement which he has brought before us this afternoon upon a subject which so nearly affects the efficiency of our army.

Colonel HUTTON (in reply): The remarks made by the different speakers hardly necessitate much reply. With reference to what the Inspector-General of Cavalry said, as to the pace of the trot, I venture to think that his remarks show some uncertainty existing in our cavalry service as to the best pace for the trot, which seems to me to be an additional reason for having it laid down clearly what the pace should be for "strategical" marching in contradistinction to "tactical" or manœuvre marching. With regard to the weight to be carried, referred to by another speaker, it does not enter into the scope of my paper to question the existing regulations, either with reference to the weight to be carried by the soldier in marching order generally, or the quality of his boots or equipment. Such points open a very large question, and one that it is impossible to deal with in a short paper. With reference to General Goodenough's remarks on the French system of training, perhaps I did not make myself sufficiently clear. The recruits and the second and third year men commence their training in "strategical" marching, so far as I was able to understand, concurrently. The principle, which I wanted to make clear, is that their training was *systematic* and *gradual*, and that it was, in the first instance, commenced by companies under the company commander; subsequently, by battalions under battalion commanders; finally, by regiments and brigades under their respective leaders. This system involves the great principle of command, viz., the combining of instruction with the leading of men. I do feel most strongly that the training of men must be vested entirely in the hands of those who have to lead them. The responsibility of instruction and the responsibility of command are inseparable—the one and the other are identical. The officer who leads must be he who instructs, whether he be the section leader, the Captain, the Colonel, or the General. The officer who cannot instruct is in my humble judgment unable to lead. Colonel Baylis mentioned the rate of march. The rate which I have ventured to suggest to you as the normal scale or standard for infantry marching is 13 miles a day. This rate is the accepted standard amongst almost all Continental Powers. It certainly tallies with the schedule as shown in Appendix B. General Lewal, the compiler, shows in this most elaborate table the length of all the important marches in the principal campaigns of Europe from 1796 to 1866, the average of which is shown to be 13·57 miles per marching day. In reply to Dr. Staples, I would remark that this distance of 13 miles per marching day must naturally be varied, according to the local circumstances, conditions of climate, &c. I might add also, in reply to the same officer, that the French do not wear socks. Socks are not an article of issue in the French army. In the case of the Chasseurs Alpins a special preparation is issued to the men to prepare their feet, and this system is, I believe, universal in the French service. The French infantry boot is not so good as the English, except, perhaps, that of the Chasseurs Alpins. The boot is very much like our own, a highlow, but the material is certainly no better, perhaps not so good. One point of excellence about the boot is that the heel of the boot, instead of being sewn at the back, is blocked, and there is consequently no seam at the back of the heel at all. The heel of the boot is sewn on either side of the foot, the heel itself being blocked. All of us who have had experience in marching troops, especially young soldiers in new ammunition boots,

know the difficulty we always have with sore heels, so that this point seems at least worth a trial. With reference to Sir Charles Fraser's remarks about young soldiers, I do not think it material to refer to the youth of some of our battalions. It is not for officers now serving to question the system under which the army exists at the present moment. It certainly does not enter into the scope of this present paper. Of course I am aware that Mr. Arnold-Forster's letters, from which I have quoted, were written with a view to proving that the army is in a demoralized state, and that the short service system is a failure. It is not my province to question the regulations of the Service. Good or bad, it is our duty to accept them. I am, however, most strongly of opinion that, if the men are young it is more than ever our business to teach them their work systematically, and to train them as we would young horses. If they are young they want more than ordinary care, a special and most elaborate scale of training; and it is to Dr. Staples and officers of the medical department that we must refer for the amount of individual physical exertion which we can expect from each of our young soldiers, and adapt our scale of training accordingly. It is intolerable for any commanding officer to argue and say that his men are too young, and therefore cannot be trained in marching. On the contrary, if they are young they will require all the more care, and all the more systematic care in training to bring them to any sort of perfection. It is a mere question of modifying the conditions, by taking weights from their backs or regulating the length of march according to the capabilities and capacities of the young soldier. With reference to the scale I have ventured to suggest for your consideration, I beg you to recollect that it is intended to be applicable, not only to the existing young battalions which we see at Aldershot and elsewhere, but also to the Militia who are all matured men, and to the Volunteer battalions, many thousands of whom we have seen at Aldershot in the last six or seven years, magnificent battalions of matured men. It is for these lattet, no less than for the regular infantry, that I have endeavoured to show in the strongest possible light the importance of marching instruction and training. So far as regards the Volunteer Force there is one point which has been raised but which I did not touch upon in my paper, most important as it is, and one which in many corps I think has been much lost sight of, that is the question of *boots*. The Volunteer battalions come to Aldershot, many of them in boots of the worst possible kind for anything in the shape of marching; in fact it would be and it is absolutely impossible for the average Volunteer battalions that come to Aldershot to march 20 miles. I submit that the question of boots for the Volunteer Force is just as important as the question of equipment and great coats. How the difficulty is to be got over, it is for the enterprising Commanding Officers of Volunteers, many of whom are here to-night, to suggest. In conclusion, I wish it to be clearly understood that the normal scales for marching which I have ventured to submit to you are merely practical suggestions for Commanding Officers and others to consider, and to adapt to the circumstances in which their regiments or corps may be placed.

Friday, March 17, 1893.

MAJOR-GENERAL LORD METHUEN, C.B., C.M.G., Commanding Home District, in the Chair.

VOLUNTEER TRANSPORT.

By Colonel T. STURMY CAVE, 1st Vol. Batt. Hants Regiment.

THE title of this paper is intended to comprehend more than the organization of a transport for the Volunteers. There is surely a necessity for creating an efficient transport for the whole of the forces apportioned for the defence of the country in case of invasion. On a sufficient and well-organized transport depends the field mobility of an army, and on its mobility depends its success, in a degree that is perhaps not fully realized. History will, I think, justify us in asserting that, if other conditions are anything like equal, the victory will be to the swift.

From classic times to the last great European war the advantage of being able to move an army rapidly in any direction has ever been the chief factor in determining the result of campaigns; when the Roman legions were led against each other by the rival Cæsars, how often was it that the victory was on the side of the most mobile? Even the Prætorians were no match for the Pannonian legions, whose mobility was such that Severus was able to march them from the banks of the Danube to within sight of Rome in less than a fortnight. Indeed, there still exists throughout Europe an evidence of the value set by the Romans on transport in the remains of the magnificent military roads they constructed. Bonaparte was a great road maker, and mobility was an element in his armies to which he attached the utmost importance. But mobility depends upon the efficiency of the transport. Colonel Furse, in his valuable book on Transport, quotes De Gerlache, who says: "The transport service is the soul of an army, because alone it gives it life and movement. It is an object which a wise administrator will not lose sight of for one moment, and to which he should devote particular attention, because the success of his operations, and consequently his honour, almost always depends upon it."

From Sir John Adye he quotes the follo ving passage: "It cannot be too constantly borne in mind that efficient transport is one element of success."

Colonel Furse himself says that "Military operations are impos-

sible without proper transport, and to place troops in the field without the means necessary for moving them cannot be but a waste of money and power."

How far I may be right perhaps the discussion on this paper may show, but I have come to the conclusion that the defeat of the French in 1870 was very much a matter of transport. At first we were all disposed to believe that the Germans possessed the best discipline, and as a result exhibited the most courage; then for some years we were taught that the magnificent victories of the Germans might be attributed to the superior leading of their armies, but recently we never hear a lecture or read a paper in a magazine on the subject without it being insisted upon that the German leading was bad, as the intentions of the commanders were invariably frustrated by the folly of their subordinates in their ambition to assume independent action. On the other side, the French were certainly in the possession of better arms; they often fought with desperate bravery, and they had the great advantage of carrying on the campaign in their own country. To what, then, is it possible to attribute their defeat, if it was not to a lack of mobility? In fact, they were not possessed of a sufficient and well-organized transport. The Germans, on the other hand, had this service so splendidly efficient that they were able to move anywhere at any time, division marched to the support of division, army corps to reinforce army corps; whole armies were swung round the flank of the enemy on a circle with a radius of many miles; the morning after battles on an immense scale corps were again on the march; in short, from beginning to end there was always displayed a perfect mobility. To what can this be attributed but to good transport?

If so much depends on transport, the question naturally arises, Is it possible to organize the service after war has been declared or become inevitable? I do not hesitate to say it is not; there is authority in abundance to support this view. Colonel Furse says: "An efficient transport is so essential for the ulterior result of all military operations, whether on a large or small scale, that no pains should be spared to ensure this essential element of success to every commander. We should not neglect in time of peace to prepare for the exigencies of war in such a difficult requisite. To organize it, so as to obtain a systematic performance of the duties required, a certain time is indispensable, and, as the short duration of modern wars abbreviates the necessary time for preparations, there is greater need for suitable preparations in time of peace."

Marshal de St. Arnaud says: "The Emperor made up his mind, and the experience of a long war confirmed this conviction, that it is indispensable that armies should have a 'train' organized on an exclusively military principle."

The Duke of Wellington is still more emphatic when discussing the wagon train. He wrote: "It is much more easy, and there are more means and facilities to form cavalry and infantry soldiers in a hurry than to form military drivers. If they are not regularly trained and formed, no reliance can be placed on them, and yet the most

important operations of war depend frequently on the due performance of their duty by this description of corps."

Sir Charles Napier says: "I am convinced that the baggage of an army can never be rendered properly movable in Europe or America, still less in India, unless it is formed into a corps perfectly organized. It was with great satisfaction, therefore, that I found your Lordship was disposed to such a project. It applies to every country, every army, and every climate."

Lord Strathnairn uses the following words: "I beg to record my convictions, founded on practical experience in India and the Crimea, and a careful study of all the bearings of military transport, that the idea of organizing a 'train' of which all the elements would not be under military discipline, is a fatal illusion."

Colonel Furse sums up the matter thus: "The principal military authorities agree that the transport moving with an army should be a well-disciplined corps. This discipline can only be obtained by giving that part of the transport which accompanies the troops a certain military organization. The regularity of any large body on the march is only obtained by practice, and by complying with certain rules carefully laid down for all ranks. This practice forms an important part of our drill, and to obtain the same regularity in the long transport columns which encumber the rear of a moving army, certain fixed rules must be framed and rigorously observed, and such can only be observed by a body accustomed to discipline and obedience."

Again he remarks: "Much of the efficiency of transport depends on the right selection of its officers; these should not be chosen haphazard on the breaking out of hostilities, but should be really competent ones, cognizant with the details and difficulties of the service."

The amount of transport that would be required in case of an invasion of this country may be calculated from the data given in the mobilization tables; these are detailed as follows:—

1st Army Corps	..	1,149	carriages and	5,172	horses.
2nd „	..	1,115	„	4,994	„
3rd „	..	1,142	„	5,084	„
Four Cavalry Brigades		539	„	2,454	„
Total ..	..	3,945	„	17,704	„

The above force comprises only the Regular troops at home and a small portion of the Militia. There remains the rest of the Militia, the whole of the Yeomanry and the Volunteers; these, if they are to be of any real use, must be organized into at least six more army corps, or at any rate into a mobile force equal in numbers to six army corps, and requiring transport.

Calculating on the same basis, we arrive roughly at a grand total of no less than 12,000 carriages and 50,000 horses. I presume it would require something more than one man per horse to provide the

personnel for this quantity of transport. Even this formidable array does not provide for reserve ammunition columns. There is a note at the commencement of the tables to the effect that these are to be dispensed with, and, as a substitute, reserve ammunition will be stored in field depôts situated at railway stations, or other convenient centres. Such a course as this seems to be open to objection, in that it must to some extent be detrimental to mobility; indeed, it is quite conceivable that the lack of reserve ammunition columns might under some circumstances prove little short of disastrous. It will, however, be enough for the present purpose to assume that the total as given will be all that will be required to put the military defensive forces of the country in the field.

How inadequate is the transport of the Regular forces to supply it, will be easily understood if we turn to the authorized establishment as voted by Parliament. It consists of 3,498 officers and men and 1,311 horses and mules. This establishment appears by the Army List to comprise 36 companies of transport available for field service, of which 34 are detailed to the cavalry division and three army corps in the home defence mobilization tables. They would certainly be found to fall far short of the requirements of such a force, even when supplemented to the utmost by calling up the reserves.

In these same tables one officer and 16 men are detailed to be found by each battalion of infantry and regiment of cavalry to form the regimental transport.

This system is objectionable from two points of view—first, that the men, being unaccustomed to the work, cannot be expected to perform it efficiently; secondly, that to take away a number of men from the ranks who have been trained as cavalry or infantry, just as the occasion arises that they will be wanted in their regiments, must to a certain extent impair the efficiency of their fighting unit. In this view I am supported by the remarks of Colonel Furse, who says: "Whilst on the subject of regimental transport, let us remark that an arrangement which aims at removing one officer and 23 trained non-commissioned officers and soldiers from the ranks of each infantry regiment for other purposes but fighting, at the very outbreak of a war, cannot be but extremely inconvenient. We are not so well provided with trained men to neglect this point, and, when we have plenty of other sources from which to draw expert drivers, it appears undesirable to reduce the number of our fighting men for this purpose."

There is in the foregoing quotation a discrepancy in the number of men said to be required for a regimental transport and the number detailed in the mobilization tables. Colonel Furse refers to the old scale, and it is difficult to avoid the conclusion that the compiler of the tables has endeavoured to meet Colonel Furse's objection half way by cutting down the number of men. If so, it would appear that the probable effect would be to ruin the efficiency of the regimental transport by deducting 25 per cent. of its strength while the difference to the fighting power of the battalion is not appreciably affected, the six men economized being less than one per cent.; however this may

be, when the existing Regular transport is augmented by the calling out of the reserves, and the seventeen men per battalion for regimental transports, there still will remain a deficiency in the *personnel*, while as for carriages and horses, but a very small proportion indeed will have been provided.

It is, therefore, clear that the resources of the civil community will have to be drawn upon to furnish the balance.

But confusion must certainly result from bringing together large numbers of untaught, untrained and undisciplined drivers, with their teams and carriages, unless provision be made to take charge of them with a full complement of officers and non-commissioned officers accustomed to the work, and to leaven the whole with a large proportion of trained rank and file.

I am sure any one who has had experience in simply issuing a ration to a thousand men unaccustomed to military training and discipline will bear me out in saying that it is almost impossible to avoid some men having a double portion and others going without; in addition to this, with a transport, the wagons must be parked and the horses picketed, watered, and fed, the men's dinners cooked and distributed, and all this would be a simple impossibility with a civilian transport, even with the control of such officers as could be spared by the Army Service Corps, probably not one to every 100 wagons.

To quote Colonel Furse once more, he says: "Experience has demonstrated that a military transport should in every case be organized before the actual commencement of operations, for to organize it when once the work of conveying has commenced, and which cannot for a moment be interrupted, is practically impossible."

If then it be a fact that an army cannot be efficient in the field unless it is furnished with a trained and well-organized transport to render it mobile, and that we have no sufficient Regular transport to fulfil this purpose even for the three Regular army corps, the question is, can this want be supplied by a Volunteer transport? It is my belief that it can.

In order to form an efficient transport it is not necessary to have an uniform pattern of carriage. Some Volunteer corps, with a laudable desire to look smart, have applied for and obtained the loan of general service wagons, and by horsing these have turned out a very military regimental transport; such a practice, however, is a mistake, because it is certain that in the event of an emergency these wagons would not be available. Others have purchased one or more carriages made after the type of the regulation; this cannot be said to be a wise expenditure of money. It needs but a moment's consideration to see that a vast cost would be involved to equip a sufficient force of transport in this way. The expenditure would be quite without justification.

There are in this country suitable horses, carriages, and drivers far in excess of all possible requirements; the problem is how to utilize these, how to organize them into a reliable transport for military purposes, how to infuse the necessary spirit of discipline into the

personnel, and to give in time of peace a sufficient training to the men to ensure efficiency in the hour of need.

To solve this problem we must briefly consider what discipline is, and what sort of practice is required to make a military transport. First, discipline is subordination to authority: in the Volunteer force this can only be brought about by the habits inculcated on the drill-ground, and by confidence in the officers in authority. It may be observed in passing that these are the most important factors in producing real discipline in the Regular forces. It is true that in the Regulars the fear of punishment plays an important part, as it cannot do in a Volunteer force, but I think the best authorities are agreed that the most important elements are habit and respect for superiors. At any rate, if the conditions of Volunteer service are such as to produce a discipline that can be relied upon, in troops that must be so much to the front as infantry, then it must be equally capable of rendering the *personnel* of a transport sufficiently disciplined. Thus the Volunteers of the transport should be drilled in the same sort of squad drill that the men of the Regular transport service are drilled in; they should not, in my opinion, be troubled with musketry or infantry drill; they should be taught the transport drill, moving as skeleton companies, each man representing a wagon. But above all things they should have a certain amount of practice in the field with the wagons and horses every year. It has been said, I believe, "that any carman can drive a team, and, therefore, as there are plenty of good carmen and teams to be had in this country there is no necessity to organize and train a Volunteer transport." It appears to me it might almost as well be said that as there are plenty of men and muskets there is, therefore, no occasion to organize and train infantry.

There will, however, no doubt be found some difficulty in getting the carmen or carters, whose time is so fully occupied with their civil duties, to do much drill as Volunteers; at the same time it is necessary that these men should be part of the Volunteer transport corps, that they should be enrolled so that they should come under the same discipline, and that they should as far as possible have an idea of the rudiments of drill and duties of transport drivers in the field. A certain proportion of them will no doubt be able to come to the annual training for several years in succession, but still it is necessary to organize and train the force so as to be independent of those men who happen to have done the work before, for it will often occur that even for the annual training some different locality may be selected, and that too far from the place of former trainings to render it desirable or even possible to obtain the same men and horses. Apart from the exigencies of peace training, it is not desirable to rely on always having the same drivers, because when the emergency arises the carriages and horses with their carmen and carters in the neighbourhood of the places of concentration will be those who will have to form the transport. As I will try to show presently, it is possible to find a means whereby a fairly military force in all details may be created in spite of this element of the untrained civilian

driver. But before entering into this I may perhaps read a short manual, written in 1885, to be placed in the hands of each untrained driver when he was enrolled, and before he proceeded with his team to the place of rendezvous.

"*Discipline.*

"1. The drivers will bear in mind that, being enrolled Volunteers, they are subject to the Volunteer Regulations and Regimental Standing Orders and Rules, except so far as the latter apply to fines, from which they are specially exempted.

"2. While in uniform or on duty they are under the command of the officers and non-commissioned officers of the regiment.

"*Duties*

"1. The drivers will be the men sent by the owners with the horses and wagons or carts; each one will drive his own horses, and be responsible for them, and take care of them, and of the wagon or cart, harness, and tackle he brings with him, and all articles that may be issued to him from regimental stores.

"2. One man from the regiment will be told off as assistant to each driver. These men will be called the wagoners.

"3. A hempen halter will be issued for each horse immediately on assembling. These halters will be put on under the bridles, and will not be removed at any time, except with the special permission of the transport officer.

"4. Strong head stalls will also be issued where they are not provided by the owner; and great care must be taken at all times that the horses do not break loose.

"5. Drivers will not load or unload the wagons, but the wagoners will help to pack stores in the wagons, and will see that they are so packed as to be secure.

"6. The wagoners will help the drivers in harnessing, feeding, cleaning, &c., and perform any other duty the transport officer may direct.

"7. Under no circumstances will both the driver and his wagoner be allowed to leave the camp at the same time except in charge of their horses.

"8. The stores to be carried in each wagon, &c., will be in accordance with the regulations laid down in *The Manual for Regimental Transport* (*Infantry*), 1877.

"*Drill.*

"1. The drivers will ride on the right front of their wagons or carts, the wagoners on the left front. They will mount and dismount by word of command.

"2. Drivers and wagoners will cease to talk at the word '*Attention*,' and, if they are not mounted, place themselves at the heads of their horses. At the word '*Easy*' conversation may be resumed.

"3. At the word '*Prepare to Mount*' the drivers will place themselves on the off side with the reins in their right hands, and the

wagoners on the near side of the head of the wagon or cart ready to step up.

"On the word '*Mount*' the drivers and wagoners will step up smartly, and seat themselves on the head of the wagon or cart, except in cases where the horses are restive, when the wagoners will remain at their heads until they have to move off.

"4. At the word '*Prepare to Dismount*' drivers and wagoners will get ready to step down.

"On the word '*Dismount*' they will step down smartly together, and at once move to the horses' heads to hold them if necessary.

"5. The transport will move off and halt by word of command.

"6. The distance between wagons and carts when on the march will be one horse's length from heads of horses to the tail of wagon or cart in their front. This must be increased when going down hill to such distance as the transport officer may direct.

"7. When the word '*March*' or '*Halt*' is given all wagons or carts in the transport, or that portion of it which is named, will move off or stop as nearly at the same moment as possible.

"When on the road of march drivers must look out that, in case they do not hear the word of command, they move off or stop when the wagon or cart in front of them does so.

"At the word '*Halt*' drivers will hold up their whips above their heads, as a signal to those in rear.

"8. In case of the sudden stoppage of a wagon in front, leaving a driver in rear no time to stop, he will turn his horses' heads to the *off* side to prevent coming in contact with the wagon or cart unexpectedly come to a standstill."

The military element in the Volunteer transport, by which I mean the discipline, the drill and the knowledge of camp routine, &c., must be established and maintained by the officers, non-commissioned officers, and efficient Volunteers enrolled in the transport corps under the same conditions and with the same obligations as in the case of other Volunteers, with the exception of such modifications as the different nature of the work requires; that is to say, the examinations for the officers and sergeants should be in transport drill and duties, not infantry, the men should not be compelled to pass in musketry in order to become efficient, and the detail of the drills they should attend might be somewhat modified. But above all, for an efficient transport it is necessary that there should be musters, drills, and practice in the field with the carriages and horses.

This mustering should, whenever possible, be with other troops in camp, and the period should be for not less than three days, including the day of arrival and departure. On these occasions the corps will learn the parking of wagons, the tethering of horses, and how to overcome the difficulties that will always occur in the field. At times flying column work should be performed with its consequent moving of stores. Without such practices in the field no transport can possibly be efficient, and unless it is done confusion will assuredly result when the emergency arises.

I would suggest for the organization of a Volunteer transport, that corps should be established in certain great centres, where the necessary carriages and horses are available. London, of course, would be the headquarters of the largest of these corps; for the others it would be advisable to consult the unpublished portion of the mobilization scheme, and, as far as possible, to fix upon localities near to the places where concentration of the forces is contemplated, but it is quite possible that it might not be found practicable to have this contiguity in some instances, because it would be absolutely necessary to have the headquarters of these corps in the great centres of population where the civil transport exists and could be obtained for the purposes of practice. I have, however, endeavoured to show that this is no insuperable objection, as in such a case no attempt would be made to march the wagons and horses from the headquarters of the corps to the places of concentration, but the corps consisting of the officers, non-commissioned officers, and wagoners would be moved by rail to wherever required, there, in conjunction with the carters who would come with their teams, to form a transport out of the material available in the neighbourhood.

In addition to London, such places as Bristol, Birmingham, Manchester, and Glasgow suggest themselves as towns where there must be amply sufficient resources to form large transport corps with establishments of many companies, from which could be drawn all the details necessary for general service with the three army corps of the mobilization tables.

For the Volunteer infantry force, brigade transport corps should be organized. The brigade organization is, I think, better than the so-called regimental, that is, battalion, for the following reasons: the number of men required for a battalion transport is so small that even one officer is too great a proportion; it is, moreover, too small for purposes of instruction, for it must be borne in mind that with Volunteers you can never depend on having more than a certain percentage on parade, nor can you rely on always having the one officer on parade, it is too small a force to have one specially qualified sergeant-instructor told off to it, and it is too small to be a separate administrative unit. But for a brigade transport a company with the establishment of an ordinary infantry company is as nearly as possible what is wanted.

Such a company can have a sergeant-instructor; he should, if possible, be a man who has done his regular service in the Army Service Corps; all the officers and sergeants of the company will be mounted, and the whole of their energies and attention will be devoted to transport work, and not distracted by anything else. The company would form one company of one battalion for purposes of discipline, but would for administrative purposes be an independent unit just as the outlying companies of a scattered battalion are now. In most instances these companies should be raised on purpose as an increase of the establishment of the battalion to which they would belong, but it is of course possible that there may be in some strong battalions a company that could be spared and which

might be so situated that it could be converted into the brigade transport corps; matters of this nature could well be left to the discretion of the Volunteer brigadiers.

It may be said that the scheme I have propounded is not new, but only a development of what has been tried so far as regimental transport is concerned. This is undoubtedly true, and so much the better, because it enables me to quote results which I have no hesitation in saying are very satisfactory, and go a long way to prove the possibility of the further development which it is quite time to set about in earnest.

It was in 1885 that General Sir George Willis, then commanding at Portsmouth, addresssd a circular to the Volunteer commanding officers in the Southern District, pointing out that the Volunteers were without the means of transport, and in no way prepared to take the field in case of invasion, and suggesting that it was most desirable that regimental transport should be organized, on a scale he set forth in the circular. In compliance with this, owners were invited to lend the wagons and horses and to send them in charge of the carters who habitually took care of them, to the camp that was to be formed by the 1st Hants Battalion at Avington in August of that year. Officers were appointed to take charge of these men and teams, and as soon as the battalion reached the camp men were told off to act as wagoners, these men had three or four days' drill as a transport company before the arrival of the wagons, and during the one clear day the teams were with the battalion a march out was practised, taking the equipment in the wagons.

The success that rewarded this attempt will be best described by quoting from the official report of the transport officer sent on purpose to furnish the authorities with information on the subject.

His report is dated Portsmouth, August 1st, 1885. In it he says:—

"On arrival at the camp of the 1st Hants Volunteers at Avington Park, near Winchester, I found that the rendezvous for the transport had been fixed for 3 P.M., near Itchen Abbas Station, about a mile and a half from the camp.

"The battalion had moved into camp on the previous Monday, and the officer commanding had immediately told off one man to each vehicle expected (21 in number), to act as attendant driver. The drivers themselves were in different parts of the country, with their respective vehicles and horses, and were not to arrive until the Thursday. The 'attendant drivers' had been put through an elementary course of wagon drill on foot, the wagons being imaginary, and it speaks most highly for their individual intelligence and the attention they must have paid to instruction, that they should have so thoroughly grasped the idea in such a short time. On Thursday the 'attendant drivers' were marched down to the rendezvous, where all the vehicles assembled with punctuality.

"Total: 21 vehicles, 38 horses, 42 men, 1 officer, 1 sergeant. Both the latter were mounted, which made a total of 40 horses. Column

of route was formed, the wagons moving off as numbered. The horses were of excellent quality.

"On entering Avington Park a few manœuvres were tried, such as forming line on the reverse flank, and then moving off again in column of route, &c., all of which were performed without a hitch, and with really extraordinary precision.

"I was especially struck with the way in which things were done, without noise or unnecessary talking.

"Finally, the wagons were parked, and the horses groomed, watered, and fed.

"Next day the battalion marched out a distance of six or seven miles. Tentage was carried at the rate of six tents per company (10 companies); supplies for the day for every one, including officers' mess, cooking utensils, firewood, ammunition, entrenching tools, and, in fact, everything necessary for an encampment as if on service.

"At an early hour the wagons were loaded, the battalion moved off about 9 A.M., and the transport followed with a baggage guard. Opposite the Guildhall, Winchester, there was a halt, the regiment forming up in quarter column. Owing to want of space the transport formed up in rear of the battalion, in column of half companies. This manœuvre, which had not been tried on the previous day, was executed without a mistake, the only information being that which could be given to the men whilst on the line of march, immediately prior to the formation.

"The march was then resumed to Flower Down, where the transport was formed into line, horses unhooked and fed, &c. At the conclusion of the day the transport moved off, first retiring on Avington Park by the upper road, through the Worthys, and followed by the battalion.

"The transport was dismissed on Saturday morning, the 1st inst.

"In conclusion, I must say that the experiment succeeded beyond my hopes. From first to last there was not a single hitch of any kind. The men worked willingly and with the greatest intelligence; and, as I before said, I was particularly struck with their steadiness, and with the entire absence of undue noise.

"I am certain that, if properly supported, a most important addition could be made to the whole Volunteer force in the way of transport, and there can hardly be any doubt as to the advisability of imparting mobility to so important a branch of our national defence.

"The drivers and attendant drivers should be occupied solely with their vehicles and horses, finding their own stable picquets only.

"The attendant drivers should always be in charge of the same vehicle, and should be held responsible for the load on the line of march.

"The drivers should remain permanently with the same wagons and horses.

"(Signed) E. C. Huyshe,
Major, D.A.C.G."

The next practice made upon these lines was in 1887, when the work was of a thoroughly practical nature; the battalion was encamped at Basingstoke, where it was inspected by the Officer Commanding the 37th Regimental District, on the 7th of July. On the morning of this day the wagons had been assembled, the attendant drivers having undergone the three days' preliminary course as before, and being told off to the wagons on their arrival in camp. Colonel Moorsom, the inspecting officer, stated in his report to the Assistant Quartermaster-General that "the wagons and carts supplied were admirably suited to the different purposes required, and all were splendidly horsed. The appearance of the drivers in uniform was very smart, and the drill of the corps would have been highly creditable to the officer in command (Second Lieutenant Hewett) had they been a week, instead of only a few hours, in camp. The transport, formed in line in two ranks, saluted, and then ranked past in capital style. I was exceedingly taken with its serviceable and smart appearance, and nothing could have been more successful than its practical performance in the conveyance of the baggage and stores of the battalion in its march to Fleet, prior to the Jubilee Review."

In the concluding paragraph, allusion is made to the march of the battalion from Basingstoke to Fleet, which was undertaken to enable the battalion to take part in the Jubilee Review, at Aldershot, on the 9th of July. On this occasion General Sir George Willis came himself to see the result of the movement, and his report to the Quartermaster-General ran as follows:—

"25th August, 1887.

"I have to inform you that I joined the 1st Volunteer Battalion, Hants Regiment, on the march between Basingstoke and Fleet, on the 8th of July last, for the purpose of ascertaining the exact state of the transport, and forming an opinion as to its efficiency.

"The amount of transport exceeded that laid down in my scheme, transmitted to you on the 10th June, 1885; but that was accounted for by vehicles having been taken up for the conveyance of the men's valises during a march in exceptionally hot weather.

"During the march of 14 miles the transport followed close in rear of the battalion in the most orderly and military manner, and there was no straggling or falling out.

"During the mid-day halt the transport was regularly parked, and the horses were watered and fed.

"On arrival at the camping ground the battalion took up its position, and the transport filed to the allotted ground for the camp, and formed up most regularly.

"The camp was pitched very quickly, dinners were cooked, and in an hour the camp was completely formed in all respects. In the evening the officers sat down to an excellent mess dinner in a marquee; the whole of the equipment and supplies for over 800 men having been moved by the Volunteer regimental transport from the camp near Basingstoke, where the battalion had been under canvas for six days.

"Had it been necessary, the battalion could have marched right away to any part of the country, conveying all its equipment and stores with it, without requiring outside assistance of any sort, beyond a route from you, and authority to obtain rations and forage *en route*.

"This is the second experiment made in this district with Volunteer transport, and both have proved so successful that I should strongly urge the official recognition of this inexpensive system—a system which must prove invaluable in case of any sudden attempt at invasion, as it will enable the most quickly-available reserves to take the field complete in transport at short notice, and long before the militia and the first class army reserve could be called up and equipped."

These reports gave so favourable an impression of the desirability of further trial on the same lines, that in 1888 the Government was induced to include a sum of 450*l.* in the Estimates towards the expenses of such a further experiment. This was divided amongst ten selected battalions, all of whom entered into the work with the utmost zeal. The circular initiating the trial concluded with the following words: "Should the experiment, as is hoped, prove successful, it will be a matter for consideration whether the principle may not be further extended; and, bearing this in mind, it appears desirable that Volunteer corps named in the accompanying list, other than those drawing the grant, should be invited to keep a register of all suitable transport in the locality that could be obtained under like conditions, so that in the event of such an extension they would be prepared to obtain the necessary transport."

The result of this trial seems to have far surpassed the expectations of the authorities; abstracts of the reports were published, and from them it is clear that no difficulty was met with in carrying out the intention in any part of the country from Roxburg and Selkirk to Berks and Hants. In spite of this, however, and the official suggestion as to an extension of the system, nothing further has been heard of it, to the great disappointment of many commanding officers, who were looking forward with much satisfaction to so valuable an addition to the efficiency of their battalions.

The possibility of extending the scheme, as I am proposing, so that it shall include not only brigade transport for the infantry volunteers but several corps for general service, is intimately connected with expense.

Dealing with the question of a Volunteer transport, and, since it is to be a Volunteer transport, the wagons should be obtained without payment or hire. Is there a reasonable probability, it may be asked, of thus obtaining them? Yes, certainly there is. What was the result when, in compliance with the circular of Sir George Willis, we appealed to the owners of teams? The response was actually enthusiastic, and we have never since had any difficulty in getting whatever transport we wanted. In the reports of the ten battalions who tried it in 1888 there is no mention

of any difficulty being experienced in this respect, while some specially allude to the praiseworthy spirit with which their demands were met by the gentry and farmers. I am persuaded that all that is really necessary is for the authorities to plainly let it be understood what is required in order to make our defensive forces efficient, and there will be no difficulty in obtaining the loan of all the horses and wagons that will be wanted; but it can hardly be expected that this spirit will be manifested by the public if the responsible authorities do not recognise the importance of the subject.

Of course I know that an increase of establishment would mean an extra charge on the public exchequer, but the force is not up to its authorized numbers, and until the increase surpassed that, the charge for the Volunteer *personnel* could not be considered to go beyond that already contemplated by Parliament, while if it did so surpass it I am fully convinced that there would be nothing more popular or more cheerfully borne than an additional vote for an increased number of Volunteers, especially if it were understood that it was for the purpose of a transport which was to render the whole of our army of defence, Regulars as well as Militia and Volunteers, efficient, which I contend they are not at present for the lack of mobility.

There are 33 Volunteer infantry brigades for which there should be formed 33 transport companies, as part and parcel of the brigades; in addition, if 80 companies were formed for general service they would afford the necessary increase in *personnel* to work the 10,000 carriages, reckoning that the Army Service Corps could provide for 2,000. In all, 113 Volunteer transport companies. After the experience in my own battalion, during the eight years we have worked on the plan suggested, I calculate that, in addition to the capitation and camp allowances, a transport company can be made a success with an annual grant of 50*l*.

Thus the special sum required for transport expenses would be 5,650*l*. There would also be the staff of instructors and adjutants for the general service corps, for which 10,000*l*. would be required. If, however, the Volunteer force should at any time be able to enrol up to its present authorized establishment, as I sincerely hope it may, so that these transport corps would be an actual increase of establishment, and the capitation and camp allowances become an extra beyond the amount already contemplated by Parliament, 200*l*. per company must then be added, or a total of 22,600*l*. Thus, including every possible head of expenditure, the cost of the Volunteer transport I propose would be under 50,000*l*. a year; this is less than the fiftieth part of a penny in the income tax, and less than the income of many an individual Englishman. For this sum, as I believe, we should be able to change our defensive forces from masses of troops unable to move, into mobile army corps capable of concentrating on any strategical lines, marching at the will of its generals, and striking an invader at any time and in any place the most convenient to ourselves and the most disastrous to him.

Colonel Sir WILLIAM HUMPHERY: Colonel Cave has so thoroughly exhausted all that I had to say, for we have been of one mind and worked together in the organization of transport, that any remarks I could now make would be not much more than a repetition of what he has said. I can bear him out in every way, and I am perfectly satisfied that the extra expense the Government would have to bear would be wisely incurred, because, unless you have the power of moving your forces, all the money spent on the Volunteer force is more or less thrown away. For in time of war, if they were called out, unless they could be moved and fed they would be perfectly useless. In fact, it appears to me that, in not thoroughly making your force mobile, you are, as I said, wasting the money expended on the force itself. From our experience of what we did in our battalion, I am perfectly satisfied that if every brigade had a transport corps of one company, they could do all that is necessary, and, even if it were not wanted for themselves, it would be a great service to the Regular force, because I doubt whether they have sufficient transport of their own, and if we did not want it they could make use of it. I am sure the Volunteers would be only too delighted to be used by the Regulars in any case where it was a question of defending their country.

Lieut.-Colonel LUCAS: I must say I think we are very much indebted to Colonel Cave for the very exhaustive way in which he has treated this most interesting subject. There is one thing I may perhaps be allowed to refer to that is a personal matter. I am transport officer of one of the London brigades, and it struck me that possibly the suggestions which Colonel Cave makes do not quite apply to the London corps; there would be some slight difficulty in carrying them out. I think all his suggestions are based on working well with the farmers and people with teams and wagons. In London we have not got teams and wagons available, and there might be some difficulty in that respect. There has been a suggestion made in our corps in London, and carried out by them. They have an arrangement with a large firm of carriers, but I do not think the carriers of London would be able to supply the wants of the four large brigades in London, and so I think it might be well that we should consider some way for supplying the London corps in addition to being dependent upon firms. That is the only thing that struck me; I do not say it is a weak spot, but it is the only matter which requires some slight addition to the very clever scheme that Colonel Cave suggests.

Colonel Sir WILLIAM HUMPHERY: I omitted to say one thing, in which I thought I did not quite agree with Colonel Cave, and that is, I think it would be advisable that the transport corps should be practised in musketry, because this training might be very necessary when defending their wagons and transport, and, unless they were able to use their rifles effectively, it might lead to disaster.

Lieutenant-Colonel CARRÉ: Colonel Cave has made no reference to the position to be occupied by the Volunteers in case of invasion, which is a subject, I consider, intimately connected with the lecture. Our south and east coasts are undoubtedly the dangerous zones, and we may imagine the Volunteers massed in positions such as Dartmoor, Salisbury Plain, Brighton, Chelmsford, Newmarket, and York. If this hypothesis is correct, I think our railway systems would perform the main duties of the transport and maintenance of the force, though, no doubt, a supplementary cart or pack transport may be necessary.

Major COPEMAN: There is a comparatively trifling matter I should like to mention in connection with this lecture, and that is, the remark of Colonel Cave, that the provision of military regimental transport wagons by the Volunteers would be a waste of money and ought not to be encouraged. I think he will allow me to make one small exception in that sweeping condemnation of special carriages, and that is the question of the regimental water-cart. It is a thing which is always necessary, which is very useful, and which we cannot always get when we want. We have to draw it from the army stores with considerable difficulty, and then the water-carts are not always those which are most convenient for the service of Volunteers. Therefore, I think, even if we concede his argument that the wagons of the country should be used in carrying the stores, at any rate it is most desirable that Volunteer regiments should be provided with their own water-carts. I have had some little experience in that particular. In the 2nd London Rifles, with whom I have been down to Dover and other places several times, and also

with my own regiment in Norfolk, we have had a cart to carry water sufficient for 400 men. We have also been able to carry rations for 200 men on this cart, and we have carried the ambulance stretchers lashed to the side of the cart. With one horse, going over very difficult and heavy country, we have been able, with this water-cart, to keep the men supplied with rations and water when the regimental wagon, with two teams of horses, has been left at the bottom of some of the hills. One of the advantages of giving Volunteers a free hand in these matters is, that it enlarges our experience. We are able to test what is necessary, what is most convenient, and it certainly is an encouragement to invention and to recognising the wants of the men, and providing them with all the means to carry their necessaries for long distances. The water-cart has been already mentioned, as some members of this Institution may remember, in a paper read here by myself in 1888. It is the counterpart of the transport water-carriage sent out to the Soudan to be used at Suakim, and these water-carts, besides doing what I have mentioned in the way of providing water and carriage, are also capable, six of them, of being formed into pontoons to transport the troops across water in case of necessity. The cart above mentioned was horsed by Messrs. Pickford on the occasion of the Easter Manœuvres referred to, and their ordinary cart harness was found suitable.

Lieutenant HEATH, 18th Middx. and Commanding Supply Detachment, North London Volunteer Brigade: I am very pleased to be here to-day to exchange ideas with Colonel Cave on this question of transport. It is a question which has occupied my mind for many years. It is one which is most important to the Volunteers' well-being and efficiency. Unless an army can be properly supplied with transport it cannot maintain the field very long. It struck me some years ago,—about the same time that Sir William Humphery started his transport in Hampshire,—that it was possible to form Volunteer transport. I wrote several letters to the Volunteer press on the subject and applied myself to see how it could be carried out, and it might be of interest to your lordship, and also to Colonel Cave and many gentlemen present, to hear some of the results of my endeavours in that direction. I made application to the War Office, through Colonel Gordon Ives, to form a Volunteer Transport regimentally. I did not get permission to carry it out until some three years afterwards. I set myself to work about it, and in a very short time I got a complete transport registered at the headquarters of my regiment, the 18th Middx. R.V. (Paddington), that could move the equipage for 1,000 men anywhere in England. The vans carried rather more than the ordinary weights provided for the Army Service Corps wagons. I went personally to owners and said, "If you cannot give personal service you must give voluntary service with horses and wagons." I was very successful, and in a very short time found a complete transport sufficient to move the regiment anywhere. I produced it on parade drawn up in two lines, in Hyde Park, July, 1888, for the inspection of the War Office authorities, headed by General Gipps, and was complimented on the appearance of the transport. I tried to get uniformity of wagons. That was impossible, but still I got good, strong, efficient wagons, running with two, three, or four horses, according to the weight put into them. They were registered, and are now registered, and are available at any time should the regiment be called out for duty in defence of the country. I think if each regiment were to register, as we have done, in its own neighbourhood, an efficient transport that would be available at very short notice, it would be a very great advantage, because there is no doubt that in the case of invasion there would be so much confusion and chaos in the country that every one would be seizing the same horse and wagon, and demanding the same man.

Lord METHUEN: What was the cost?

Lieutenant HEATH: Nothing; no expense whatever has been incurred in this idea. Colonel Cave's lecture exactly appealed to my feelings and my ideas on the subject, and I am the more delighted at this because I was not bold enough to think that anybody else had thought the same as myself. I am very pleased to find he has followed my ideas so nearly. I can assure you we have got a most efficient service. One peculiarity in my plan was that I formed the transport corps from the band. The members of the band were not very much drilled, but they all had been drilled. Why it struck me that the band would be available was that the

band is, to a certain extent, non-combatant, and it would be more easily taken out of the battalion than the efficient men who, as Colonel Cave puts it, would be a great loss to their battalion. I found there was no objection to it. In forming up this regimental transport I did exactly what Colonel Cave suggested; I drew a guard from the battalion, and placed one drilled man with each driver. The idea was that in case of an order being given, the drilled man could lead the horse round into the position required, because we could not expect the drivers, who had never been drilled, to know anything about it. I had the honour of Lord Wantage's acquaintance, and I gave his lordship the whole particulars. He sent his Adjutant, Major Colebrooke Carter, to get the plan from me, and he carried it out from my ideas in Berkshire, and I had a letter from his lordship thanking me for the plan, which he thinks is very well adapted to the requirements of the country, and a very excellent one. I looked forward with a great deal of pleasure to meeting Colonel Cave to-day, seeing that his feelings are so congenial with my own on a subject which so greatly affects the improvement and substantiality of this part of our defensive force, the Volunteers. The Governor of Cape Colony has, through his equerry, Captain Sapte, sent for and received particulars of the scheme recently.

Captain TERRY: I should like to ask Colonel Cave if he considers that brigades told off for garrison duties would require the same transport as "mobile" brigades told off to form the field army. I should hardly think that brigades in towns like Dover, Portsmouth, Plymouth, and Bristol would require field companies. Would not regimental transport suffice? I would also ask if the commander of the transport company is to be one of the Brigade Staff, or would he be responsible to his transport officer in the Brigade Staff? The Captain in command of the transport company of a brigade should be responsible to the Brigadier, and no Staff officer is required unless the brigade is so large as to require two companies.

Major SATTERTHWAITE: I unfortunately was not able to be here at the commencement of this discussion; therefore, if I mention any subject referred to by previous speakers, I must ask leave to apologize. I had meant to mention the question of water supply to troops in the field, but that has already been touched upon, and I will not go any further into it, except to mention that I believe the Turks had their water supply on mules instead of in carts. They had, I believe, one water mule for each company. The supply of intrenching tools also, I think, might very easily and properly be arranged in peace-time, instead of being left for time of war. Then as to ammunition supply, I am not sure whether Colonel Cave has any means of supplying ammunition to troops in the field. In my battalion we have a two-wheeled cart, started, in the first instance, by a non-commissioned officer, and when he was unable to continue it we brought into the service a butcher's cart. That holds something like 6,000 rounds of ammunition. We put a panel into the side, so that the butcher's name is not visible, but the name of the battalion, and we practically found that this butcher's cart can go pretty nearly everywhere where the battalion goes. I wanted to bring these carts before your notice, in addition to Colonel Cave's wagons.

Lieut.-Colonel BAYLIS, Q.C.: As a Volunteer officer I am sure that all Volunteer officers, and, I think, the country at large, will agree with me in saying that the Volunteer army ought to be "an army of defence," complete in transport and in every respect. The Volunteers have often felt that they have deficiencies which ought to be supplemented, but then this is a question of expense, not only of money but of time. Much valuable time is heartily devoted by the Volunteers to the service of their country; in return, a great deal has been done for them of late years, but scarcely any assistance was given them in the commencement of the Volunteer movement. The country now appreciates, perhaps too highly, their existence as a military force; it certainly gives some guarantee against invasion. The Government is seeing the importance of rendering increased assistance to the Volunteers by money grants. An army which is not complete in every respect and ready at any moment to take the field, *semper paratus*, is only a mere false dependence. I quite agree with what was said by the lecturer, that we know not at any time when our services may be required. In the old wars, at the onset, the British soldier, it is said, was never ready at first, and consequently sustained reverses, but, like the lion aroused from his slumber, he soon retrieved his misfortunes by his

courage and endurance. In future wars this will not be possible. Wars will be so rapid and the results so great that we must be prepared for war before it breaks out. I would rather have 100 men thoroughly efficient than 1,000 men who are not efficient and encumber the commissariat. In 1888 the Government included in the Estimates 450*l.* for Volunteer transport, in consequence of the experiments in 1885 and 1887 having proved a success, as stated by the lecturer, but at the expense of the Volunteer officers. This grant has been discontinued, although the result proved that it was deserving of continuance. I hope that the Volunteers will receive more assistance than they do from the Government, on the ground that they will then become a more efficient force, and be better able to carry out the great object of their existence, namely, home defence. I think every member of the force must be glad that the lecturer, Colonel Cave, a Volunteer officer, has come forward to suggest by his paper a practical improvement in Volunteer transport, and I think we may all congratulate ourselves that we have an experienced officer, Lord Methuen, presiding here to-day, who, as Commander-in-Chief of the District, may suggest, I dare say, something useful to Volunteers. There is one sentence in the lecture that I should like to refer to, where Colonel Cave says, "It is true that in the Regulars the fear of punishment plays an important part, as it cannot do in a Volunteer force," but I think the best authorities are agreed that the most important factors are a sense of duty, discipline, and respect for superiors. I hope that these essential qualities will always exist in the Volunteers, and not only these, but I am sure I speak the words of all Volunteers when I say there is that patriotism, loyalty, and *esprit de corps* which will carry them through all difficulties and make them do all they can to assist the Regular forces in the service of their country. I think that many officers will gain benefit from the suggestions which have fallen from the lecturer to-day, as they will be circulated in the Journal, and also from those which will fall from yourself, my Lord, which will enable Commanding Officers to do a great deal to improve the Volunteer transport in their own sphere of action. With regard to London, it may be said that the Volunteers depend upon the railways and other resources which those in the country have not. In both, I believe, the Commanding Officers are doing their utmost to make themselves fully acquainted with the means of transport available in emergency.

Colonel BIRD: Mention has been made of water-carts, ammunition-carts, and so on. I might say that we have in my battalion, the 1st Middlesex, a combined water and ammunition-cart, and appliances for carrying implements for intrenching. In this cart we can carry 8 boxes of ammunition, 620 pints of water, all the ambulance stretchers, and about 12 intrenching tools—pickaxes and crowbars—all that you would require in the first instance if you were making an attack. In fact, a cart which you could always bring up in the first or fighting line. With regard to the grant made of 450*l.* by the Government, I cannot help thinking the authorities made a mistake in not allotting one of the sums of 45*l.* to a London corps to see whether we could try the experiment. All the money was voted to provincial corps, therefore we had no opportunity of trying what we could do in London. I tried myself to get up a transport corps, and applied to several carriers for horses; but we found then that all these horses had been indented by the Government, and many of the owners were receiving the 1*l.* a year each as a retaining fee for their own transport services. Therefore we in London, unless we could find horses not already registered, should have difficulty in providing transport. I do not think, however, that there ought to be any difficulty, with such an immense number of horses as are owned by the London General Omnibus Company, and Pickford's, and the railway companies; but at the same time there is the question of many horses being already registered, and that we might find the difficulty mentioned by Mr. Heath, that we and the War Office should be struggling to get the same horse and the same man. I also found another difficulty when I came to make enquiries about the harness. I do not know whether that occurred with Colonel Cave, but I had some wagons altered to suit the Government harness, and then found they did not suit Pickford's harness. The authorities have a very clever way of improving upon everything, and the result is that they have got all their wagons and harness fitted out so that nothing will interchange. Therefore if you ever want to use these transport wagons, using Pickford's horses or anybody else's, you

will find when you try to put them in that you cannot harness them. That ought to be looked to, because it will upset all arrangements when we come to the critical time.

Colonel CAVE: With regard to the remarks Sir William Humphery made, I know I am rather in a minority on the question whether the Volunteer transport should be compelled to do musketry. We must look at it from two points of view. One point of view is that which Sir William Humphery himself suggested, that they might be called upon to protect their convoys; the other point of view is that of the Captain of the transport company, which is, that it is, to some extent, interesting and attractive to the men, and, therefore, it would not facilitate enlistment for the Volunteer Transport Corps if musketry were done away with. To both of those arguments I would say this: It is really a question of the time the Volunteer can devote to learning his duties. If a Volunteer has time to do musketry and to do the transport, and to do both well, by all means let him do it; but I think, in a very special duty like transport work, it would be better if he attended first to that portion of his duty only which fits him for his special service. By all means give him a rifle; by all means encourage him to shoot; but do not make a standard of musketry a condition of efficiency, because that affects you financially, and induces the transport officer to devote the time of the men not to the duties which, ninety-nine chances to one, they would be called upon to perform in the field. Colonel Lucas observes that he does not think we could get London owners to supply teams for this purpose so well as we can in the country. I have yet to learn that there is less patriotism in the partners and members of the London firms owning these teams—carriers and railway companies, and so on—than there is in countrymen, although I will take it as a compliment, being a countryman myself, if Colonel Lucas puts it in that way. I would further say, that the partners in such are the very gentlemen who should be officers in these corps. I wrote to several of these gentlemen, and asked them to send somebody here, but I am sorry to say they replied, that they were all so busy on account of the alteration in the railway rates that they could not attend. Colonel Carré spoke with reference to the concentration of a great number of the Volunteer force on the south and east coast, and suggested that the railways would really provide all that was necessary. Of course the corps must be concentrated, but if you concentrate the men, and cannot move them away, and are obliged to keep them round some station or on some line of railway, the result will be, inevitably, that the enemy will not take the smallest notice of them, beyond, perhaps, leaving a small force to mask them. Perhaps even that would be unnecessary, because they could not move away from the railway station; they need, therefore, trouble very little about them. Thus I do not think that it is very safe to rely upon the railways. Moreover, I think, anybody who has had any experience of detraining a large force, equipped for the field, at an ordinary country railway station, will realize that, as a rule, it takes less time to march 20 miles. It is all very well with one company, and it is moderately well with one battalion, but if you want to move brigades and divisions, and you are reckoning on one line or two lines of railway, you will find that anything like rapid mobilization is an exceedingly difficult matter; and for moving about after you are mobilized, to march round the flank of an army, or trap him in some particular place, or cut him off at some conjunction of the roads, if you are depending upon railways which are absolutely fixed, I feel pretty sure you will get into very great difficulties indeed. Major Copeman spoke as to what I said about having the ordinary carts that are to be found in the localities. I think Colonel Bird has answered that question for me, because he says that if you get a regulation cart with regulation harness, the regulation harness will not fit the horse, and the horse will not fit the cart, in fact you cannot make the thing go at all. Now the very object of my scheme is to have the horse with the harness that he is accustomed to wear in the wagon or cart in which he is accustomed to go. It all fits, and he does not get sore shoulders, and it does not break. Of course with reference to the water-cart there may be something to be said, but the very thing which Colonel Bird mentioned is exactly what took place with reference to the regulation water-carts. At the first experiment we made in 1885 we got two regulation water-carts, because we thought the carts of the neighbourhood were not very suitable for the purpose—the harness would not fit, the horse would not go in, and

we were obliged to leave the water-carts behind and take those of the neighbourhood, which we got from the side of the sheepfold, and they answered the purpose exceedingly well. Lieutenant Heath told us a good deal about the corps which he has been energetic enough to organize, which he says is practically just the same as that which I have described in my paper. But there did appear to me to be one very important element of difference. I do not learn that he has ever had that transport out for more than a single parade. A single parade is an exceedingly useful thing, but in order to render transport efficient, you must be able to deal with it when the night comes. Say, perhaps, you have a thousand wagons and horses accustomed to be two or three together at home at one farm or in one stable, the horses to be put in the stable and the men to find their corn in the bin. But when they are out on transport duty, we have to picket these horses; we have to feed them and to see that all things shall go without confusion and difficulty. It is, therefore, absolutely necessary to have practice of this kind or you cannot possibly have an efficient transport. Lieutenant Heath said the scheme was no expense at all. I would just mention that it is in connection with this matter that the expense comes in: it is necessary to provide a certain amount of tackle that the owners of the transport have not got and cannot send. One thing we find exceedingly necessary, which is mentioned in the small manual, that is, that a strong head stall should be provided, and the horse should have a spare halter. Everything must be done to provide against a stampede, to which every great number of horses in the field is liable, and you must take precautions to prevent it. Those things all cause a certain amount of expense. Captain Terry asked us about the London corps. Of course we are not in the secrets of the War Office as to where these particular corps are allotted; it is confidentially communicated to the Commanding Officers. I presume that a great many of them are located somewhere in the neighbourhood of London, and I should imagine it would be better, considering where they are, to supply them to a large extent from the general service corps. London could very well form a very efficient general service transport of about fifty companies: they would be able to supply the troops in the more immediate neighbourhood of London. Of course where they are fixed in certain positions, the railway would no doubt come in very valuable, but I think on a certain scale, and with regard to some brigades, regimental transport, or rather brigade transport, should be formed as well as the general service corps transport. Major Satterthwaite made a very excellent observation with reference to the ammunition. The supply of ammunition in the field is a matter that certainly should be under the charge and in the hands of the transport officer. That is one thing that all those brigade transports should pay particular attention to. Colonel Baylis made an observation which does not exactly apply to this subject, but it appears to me to be rather an important matter. I do not think he quite meant it, but still it is capable of misconstruction, and therefore I do not like it to pass without alluding to it. He said he would rather have 100 efficient men than 1,000 men who were not efficient. That is very true, no doubt, but I do not think the defensive forces of this country are one man too strong. We do not want to reduce our thousand men of more or less efficiency to a hundred more efficient, but we want to make the whole thousand efficient, and I am certain it can be done just as well and would be better than any attempt to increase efficiency by reducing the force. Colonel Bird also was good enough to tell us he got into some difficulty—you generally do when you have a specially made thing—that the horses and harness would not fit the wagons. There is hardly time or it might interest you to know that in the old Volunteers, in 1805, this subject was far more fully gone into than it has ever been now. That was before the days of railways, and they absolutely provided wagons and horses in those days not only to carry the provisions and implements of the men, but also the men themselves. And with regard to the system of registering, it has no doubt its use, but I cannot help thinking that the 1*l.* a head which we are told is paid for the horses so registered is really money very much wasted; because, as for registering, we know the horses are there and we know in case of emergency we should have every one of them—the Army Act provides that we shall. We can impress the lot the moment they are wanted. Therefore I do not myself see why they are registered; but if it is thought useful to register them, should it not be a condition that they shall turn out for a day or

two's practice with Volunteers as I propose? Then the money will be spent for some purpose. I cannot help thinking that the idea of registering is very much overdone. Registering without practice cannot be very much use. Registering if it is to be of any use must be registering with practice.

The CHAIRMAN (Lord Methuen): Ladies and Gentlemen, I am not going to make any remarks that will be of great value to you, because I have had myself very little time to look over the lecture, and it is a very large subject. One has to approach it with very great care, and, occupying the position I do, I wish to make use of no words and give vent to no expression that I may regret afterwards. I think that the value of this Institution, to a very great extent, is the manner in which it ventilates questions of this character, and I think no persons are more indebted to the Institution in this respect than the authorities themselves. The matter of mobilization is one which is in the hands of one of our ablest officers, Colonel Grove; he has immense difficulties to cope with, and none greater than the question of transport. I quite admit that our transport is not equal to the demand; I do not suppose even for the Regular Army we can any one of us suppose that we have as much as we require. Anyone who was assisting at the last manœuvres must have observed the difficulties and straits that the officer commanding at Aldershot was put to even to provide sufficient transport for the comparatively small number of troops assembled there. One of the officers in discussing this matter made the remark that railways should take the place to some extent of transport. I, on the contrary, think we shall require whatever transport we can get to ease the railways. Our railways are not at the best of times, on many lines, very punctual; war is unknown as yet in England, and I feel sure that in the case of invasion, when a great many people would probably lose their heads, the railways will have quite sufficient to do to move the troops without having to transport more provisions, &c., than we can possibly avoid. You must also recollect that if it comes to a matter of, say, not more than 70 miles, you will move an army corps by road quicker than you will by the best of railways. With regard to the training of transport, I quite admit that it is absolutely essential. I know no animal that more dislikes being impressed than the horse; he seems, so soon as he quits a civilian life and takes to our military life, to establish a grievance, and in the manœuvres the animal is quite ready either to jib or bolt with your machine-gun at a critical period of the action. No doubt one of our chief difficulties will not only be to provide transport, but when we have got it to know what to do with it. I can foresee immense and great difficulties, but I do not myself imagine you will be able to induce any Government to assist you in funds to find transport. I hope that my opinion is a wrong one, but I think you will have to endeavour among yourselves to arrange for your transport, and to be ready to face a certain expense. With regard to what Lieutenant Heath said, I can bear him out as to the utility of the transport of the 18th Middlesex Volunteers. I think, if I remember right, I have seen them in some of my marches, and that they were of very great value. With regard to musketry I entirely agree with the lecturer. I think you will have quite sufficient to do to train your transport officers and men and non-commissioned officers without thinking very much about their musketry. The lecturer made one observation with regard to the transport of the Germans and French in the war, and he also made some remarks detrimental to the German army. I myself am of opinion that at first perhaps we rather cried up the Germans too much, just as I think now we are all rather willing to agree with that writer or that speaker who condemns them. They fought well, and they were well led, and as regards transport you may rest well assured that the transport of an advancing and victorious army is a very much easier matter to deal with than the transport of an army absolutely outnumbered, retreating, and at sixes and sevens amongst its chiefs. I think we have no right, as far as I can read history, to condemn the transport of the French army. They have always managed their work in that respect well, and the French soldier can carry more on his back than perhaps any other soldier in Europe. I have told you I wish to commit myself very little in this matter, and I end simply by thanking Colonel Cave for the care he has taken in preparing this lecture, the trouble he has taken in establishing his regimental transport, under Colonel Sir W. Humphery, and also for having afforded so much matter for the discussion that has followed the lecture this afternoon.

Ch

Ex

In
the
to
gu
but
wi
spe
at
Ar
effi
pro
Ye
pro
com
the
to c
nati
dest
we
atta
vigi
the
spe
ship
this
redu
spee
peac
"
coas
adap
shou

FOREIGN SECTION.

CRUISERS, THEIR RÔLE AND THE CONDITIONS WHICH THEY SHOULD SATISFY. POSITION OF THE QUESTION.

Extract from an article by Vice-Admiral CAVELIER DE CUVERVILLE, in the "Revue Maritime et Coloniale," March, 1893.

IN a short article on the cruiser question under the above heading the writer remarks that "the name of cruiser should only be applied to sea-going ships in which seaworthiness has been specially safeguarded, not only as regards buoyancy, stability, and handiness, but also as to their behaviour under all circumstances of speed, wind, and weather. Are these qualities excluded by the high speed and consequent great length which are required in cruisers at the present day? With some reservations, we do not think so. Are they more or less in opposition to heavy armaments, with efficient protection against the new explosives of modern artillery, protection which necessitates the multiplication of quick-firing guns? Yes, undoubtedly, and it is this which makes the establishment of a programme of construction such a delicate matter, and which so complicates the task of the constructor and engineer. The war-ship, therefore, is a compromise between conditions more or less difficult to conciliate, and such as dominate the special circumstances of each nation and the objects it has in view. In our view the cruisers are destined: (1st) To reinforce naval divisions at distant points where we have particular interests to protect; but, above all, (2nd) to attack the commerce of the enemy, at the same time eluding the vigilance of his protecting ships. Within the last few years, and to the great advantage of the service, we have adopted a system of specialization of ships; our principal naval stations have been given ships of types particularly suited to their special requirements, and this system, which gives excellent results in practice, permits of the reduction in large measure of all these *soi-disant* cruisers without speed, protection, or range of action; economical no doubt in time of peace, but useless or compromising in time of war.

"Besides the ironclad fleet, which is the soul of our naval power, coast defence ships, torpedo-boats, torpedo-catchers, scouts, &c., ships adapted to the special rôle which their name indicates, France should have, in our opinion, a certain number of ocean cruisers of

great speed and range of action, always ready to be launched on the routes of commerce in pursuit of the enemy's trading ships. The following particulars will show how this question has been faced on the other side of the Atlantic.

"The Marine Department of the United States has endeavoured to produce a ship without equal in other navies—a combination of armament sufficiently powerful, with complete protection against light quick-firing guns, so dangerous at the present day, and with speed and range of action unknown till now in war-ships—such are the grand lines of the programme put before the constructors, and which, in the terms of the Report by the Secretary of State for the Navy addressed to the President, are in way of accomplishment. Mr. Tracy affirms 'that this type of cruiser ("Columbia") rivals in sea-going speed the fastest ships of the Atlantic fleet yet afloat, and no merchant ship, armed or not armed, would be able to escape her.' Her artillery consists of one 8-in. gun of 40 calibres in length, two 6-in. guns, and eight 4-in. quick-firing guns, with 20 of smaller calibre, and six tubes for launching torpedoes. She is protected by a protective deck, which completely covers her vital parts, 4 in. thick on the slopes, and 2 in. at the other parts. There is a coffer dam 5 ft. thick throughout the whole length of the ship filled with a special reserve of coal at the central part, and forward and aft with other suitable material. The protective armour 4 in. to 2 in. thick at the sides shelters the quick-firing guns; the 6-in. and 8-in. guns are protected by shield plates fixed to their mountings. The motive apparatus consists of three independent engines and propellers; the third propeller being placed 15 ft. below the two side propellers, and immediately astern, so that scarcely any combination of circumstances would completely paralyse the ship, and the arrangement permits of either one, two, or three propellers being used as necessary for varying conditions of speed, that is for speeds up to 15 knots, with one screw and $\frac{1}{3}$ power, 18 to 19 knots with two screws and $\frac{2}{3}$ power, and from 22 knots to a mean of 21 knots with all three screws at the full power of 20,000 I.H.P. The coal supply has been fixed at 2,000 tons, which gives the cruiser a range of action of 25,000 knots, corresponding to 103 days' steaming. In a word, this cruiser is as powerful 'for offence as any modern cruiser in existence, is sufficiently protected as to be almost invulnerable to small rapid-fire artillery, possesses an arrangement of engines which makes her independent of any ordinary casualty, can steam round the world without being obliged to stop for coals, and could easily overtake, if occasion required, the fastest steamers which cross the ocean.' Six ships of this type, continues Mr. Tracy, would suffice to destroy the commerce of any nation under present conditions, and with the means which are at present taken for its protection, &c. After patiently waiting and profiting by the experiences of Europe, the United States advances resolutely in the way pointed out by our Conseil des Travaux de la Marine, in 1887. In fact, if there is a country in need of protected cruisers of great speed and wide range of action, it is most assuredly France. We do not possess, like England, fortified coaling

stations at all parts of the globe, and the replenishment of our ships at sea is a problem not yet solved. In order to ensure peace with our neighbours and to dissuade them from joining the Triple Alliance, Admiral Aube asked for 20 cruisers of the first rank, and he was perfectly right. But still we have need of these ships sufficiently protected against the new artillery, able to contend against bad weather and to overtake the fastest mail boats, which by a simple telegram will have been transformed into auxiliary cruisers, and to defy the pursuit of the enemy as did the brave captain of the 'Alabama,' during the War of Secession. For these purposes large displacement ships are necessary; the Americans, with their practical common sense, have perfectly understood this; for them the cruiser must be an ocean-going ship having for its principal object the destruction of the enemy's commerce, and possessing consequently all the qualifications required for this special object. We do not hesitate to affirm that with a displacement of less than 6,000 tons, it is impossible to realize the desired results. We will add that the captain of such a ship requires a special preparation and special aptitude, and we do not doubt that the instruction necessary for those officers has long been the object of profound study."

T. J. H.

RECENT PROGRESS IN MARINE MACHINERY.

By NABOR SOLIANI.

(Translated from the "Rivista Marittima" for April, 1893, by T. J. HADDY, R.N.)

(*Continued from No.* 182.)

Steam Pipes.—During the last few years serious explosions have occurred in the steam pipes on board ships, and these have given rise to study, theory, and experiment on similar pipes, in order to discover the causes of these explosions, and the best means of preventing them. The explosions have occurred almost exclusively in seamed copper pipes, that is, in those which are made from a sheet of copper, bent to a tubular form, and brazed along the seam; the rupture or split taking place in the neighbourhood of the seam and parallel to it. Sometimes the fracture was produced at the end of the tube, where it had been brazed into the flange, but in all cases at some part of the tube which had been exposed to the fire during its manufacture. The persistence of this circumstance, and the observations and experiments made on the defective pipes, have shown that in the operation of brazing the metal is burnt along the seam, so that its resistance at this part is considerably diminished, or fissures are produced along the seam which are not perceived, and which afterwards cause fracture. Defects in steam pipes have become frequent, and have occasioned alarm within the last few years, since the introduction of triple expansion engines working at pressures of more than 10 atmospheres, principally because of the increased strains to which the pipes are subjected by the higher pressures, but also by reason of the higher temperatures and diminished resistance of the metal. To return to the pressures of 6 atmospheres and the period of compound engines is now impossible; we must, therefore, seek to solve the present difficulties by eliminating the causes or otherwise avoiding their effects; the technical literature on this subject is rich enough.

In the year 1888 Mr. W. Parker, in a paper, "Copper Steam Pipes for Modern High-Pressure Engines," read at the Institution of Naval Architects, after having explained the circumstances in which the explosions in the steam pipes of the "Lahn" and "Elbe" occurred, and the causes of them, proposed as a remedy the substitution of tubes without seams, manufactured by the Elmore electrolytic process, for the tubes with brazed seams. He gave the preference to these tubes over seamless drawn pipes, as he considered that the former would be of more uniform thickness and free from striæ, which are caused in drawn pipes, especially if of large diameter. However, the tubes made by the Elmore process were not exempt from defects,

which consisted principally in a certain want of molecular cohesion, the metal being scaly as a result of this.

But, independent of these imperfections in seamless tubes, there still remained the necessity of exposing them to the fire in order to braze on the flanges, and, consequently, the danger of injuring the tube at this part, besides the great difficulty of bending seamless tubes of large diameter to suit the curved direction of the steam pipes. For these reasons, and also because seamed tubes, in spite of possible imperfections, have, on the whole, given good results, many manufacturers still adhere to them, as in their opinion, when carefully made, these tubes are safe and render good service. Although agreeing with this view of the matter, we are bound to admit that, at least for pipes of moderate diameter, the manufacture and subsequent manipulation of which present no difficulties, seamless tubes undoubtedly give a greater guarantee of safety than seamed tubes, and for this reason it is necessary to make general use of the seamless tubes within these limits. For tubes of large diameter, which must be made from copper sheets, the plan has been proposed and adopted of serving them over with copper, brass, or steel wire, in order to obviate any danger of rupture arising from imperfections in the brazing. This practice, introduced for the first time in England in ships of the Royal navy, has been adopted also by us, and I shall speak more particularly of it further on.

In order to eliminate the difficulties inherent to copper tubes, some have proposed to adopt tubes of iron or steel with screwed or riveted joints at their extremities, on board ships, instead of copper tubes, as is frequently done for installations on land. In this regard it will be useful to cite the article by Mr. M. Sandison, "Main Steam Pipes," in "Transactions of the North-east Coast Institution of Engineers and Shipbuilders," vol. iii, in which he gives important information on the good results obtained with iron steam pipes on the ship "Claremont," and proposes their adoption. It was objected that with steam pipes of iron or steel there was a danger of corrosion, and that their great rigidity prevented their readily adapting themselves to the deformations of the hull of the ship, to expansion and contraction, &c., so that greater precautions are necessary for liberty of dilation and movement; but these difficulties are not insurmountable, and the idea is gaining favour.

Returning to copper steam pipes, to Mr. Denny of Dumbarton is due the idea of reinforcing seamed pipes with hoops of iron or steel, shrunk on at short intervals on the pipe; but recent and very accurate experiments carried out in America by Commodore George W. Melville, Engineer-in-Chief of the United States navy, have shown that these hoops, although they may limit the extent of the rupture, are not sufficient to prevent it, and do not add sensibly to the strength of the tubes at the spaces between the rings. The practice of serving over the tubes with one or more layers of closely-laid metal wire, appears, therefore, the most convenient; the rules for this method adopted in our navy, at least for the present, are the following :—

1st. In new ships all the steam pipes up to a diameter of 20 cm. (about 8 in.) shall be drawn tubes, or otherwise made without seams. Above this diameter the tubes shall be made in the ordinary manner, that is, from copper sheets with brazed seams, but after they are finished complete with their flanges, they shall be served over with a close spiral of copper, brass, or Delta metal wire.

2nd. The covering of continuous close spirals of wire being only possible with straight tubes, the arrangement of pipes shall be designed to take straight lengths of tube, and at the elbows, or where curved pieces are inevitable, these shall be of cast bronze.

3rd. The wire shall have either a circular or rectangular section, and be of such thickness as to enable it to stand the steam pressure independently of the tube, which is to be considered simply as a shell to contain the steam.

4th. The covering should consist of two or more wires, applied side by side, in so many parallel threads, so that in case one of the wires is broken the tube will still be effectually safeguarded by the remaining wire or wires.

5th. Each wire shall be wound on the tube with a tension of about $2\frac{1}{2}$ kilos. per square millimetre of section of the wire, the ends of the wires shall be fixed independently of each other to the flanges of the tube. When it is found necessary to lengthen a wire during the process of winding, the wire already wound must be first secured to prevent its slacking up, and the quality of the joint with the new wire is to be tested by submitting it to a tension of double the above before liberating the other part of the wire, and continuing the winding. A similar test should be applied to joints which may already exist in the wire.

6th. The tubes must stand the usual hydraulic test before the wire has been wound on them. The wire is to be wound on the tubes in the lathe, on the slide rest of which is fitted the roller for the wire and the apparatus for the tension; one thread at a time is to be applied with a pitch equal to as many times the diameter of the wire as there are wires to be wound, so that between its spirals the proper space is left for the remaining threads. Delta metal wire appears to be very suitable for this purpose, since it preserves a resistance much superior to that of copper, even at the temperature of melting tin. In the following table, taken from the "Engineer" of 1891, are the results of experiments made by the Fairfield Shipbuilding and Engineering Company of Glasgow, in order to determine the resistance of copper or Delta metal wire, with augmentation of temperature.

Material of wire.	Diameter.	Area.	Resistance.	Extension.	Temperature.
	in.	sq. in.	tons per sq. in.	p. c.	
Delta metal, unannealed	0·115	0·0103	58·55	2 08	Atmosphere
Copper, unannealed	0·18	0·0254	31·5	3·125	do.
Delta metal, annealed	0·115	0·0103	38·7	27·03	do.
Copper, annealed	0·18	0·0254	18·6	35·46	do.
Copper	0·18	0·0254	21·65	3·64	about 450° F.
	0·18	0·0254	23·62	4·16	do.
	0·18	0·0254	21·65	4·16	do.
Delta metal..	0·115	0·0103	50·97	11·45	do.
	0·115	0·0103	48·54	9·54	do.
	0·115	0·0103	48·54	8·854	do.

The regulations just given, as I have indicated, are of a provisional character. Whilst vigorous efforts are being made to substitute iron or steel tubes for those of copper, considerable progress has been made in the manufacture of copper pipes, so that these can now be obtained of large diameter without seams, and with a sufficient guarantee of safety; and it is probable that, by reason of these continued improvements in the manufacture, such a degree of perfection and safety may eventually be reached as shall merit the preference of these over brazed tubes or tubes of iron or steel. A method which promises to unite the advantages of brazed and seamless copper tubes is indicated in Fig. 27, the "Clinch Jones" system of manufacture.

An excellent paper on the actual state of the question regarding steam pipes was read by Mr. W. I. Novers Brett, at the Institute of Marine Engineers, "Steam Pipes, their Material, Workmanship, and Arrangement."[1] . . . In order to ascertain the quality of the brazed pipes, after they are completed, Mr. Brett suggests, as very good practice, the method followed by Mr. Denny, of Dumbarton, which consists: 1st. In a water pressure test to double the working pressure, during which the pipe should be examined by the aid of a magnifying lens along the seam, at the same time tapping the part under examination with a small hammer in order to discover defects. 2nd. In a water pressure test to double the working pressure, after all the pipes are fitted in place. With regard to planishing by hammering, Mr. Brett says, "This operation does not damage the pipes if care is taken to anneal them afterwards; but it sometimes happens that the pipes are planished after annealing also, in which case it may be carried to such an extent as to render the metal hard and brittle, two qualities which are dangerous in steam pipes."

[1] A considerable amount of technical detail on workshop practice in the manufacture of brazed tubes has here been omitted in this translation. It was taken from Mr. W. I. Novers Brett's paper, quoted by the author.—T. J. H.

In a foot-note the author says: "Many are of the opinion that this practice of planishing by the hammer should be very sparingly followed. The metal of the tubes, even when they have been properly annealed before being fitted in place, becomes in time hard and brittle, and for this reason steam pipes should be dismounted and reannealed periodically, especially on the occasion of renewing boilers or during any considerable repair." In order to avoid the difficulties met with in brazing flanges, Mr. Pope has suggested doing away with them, and substituting loose collars for coupling the pipes together, fitted as shown in Fig. 28. The collars, if they are in one piece, must be put on the pipes before the ends are turned up, but they can also be made in halves, which is more convenient for removing and renewing them. They can be made of cast iron, malleable cast iron, or cast steel, but, according to Mr. Brett, cast steel is preferable. The plan has proved satisfactory in practice, and has met with much support.

Since steam pipes may be ruptured, however well made, by sudden changes of temperature and pressure, resulting in the production of masses of water driven violently along the pipes and suddenly checked by bends and restricted passages due to valves, &c., it is necessary to avoid these changes of temperature as much as possible, and to provide efficient drainage for the water at the parts of the steam pipes at which it would otherwise accumulate. It is therefore a good practice, and one which is followed also in our navy, to open all the valves on the steam pipes soon after the fires have been lighted in the boilers, so that the hot air and vapour as soon as formed may gradually warm up the pipes and the cylinders of the engines. Besides the ordinary separators, in order to completely drain the steam pipes of the water brought over with the steam or formed by condensation, drain cocks worked by hand are fitted, or, better still, drain tanks which act automatically. Fig. 29 shows one of the latter of the "Foley" type, which has been fitted on many ships in our navy with good results. Maudslay's automatic drain, also in use in our navy, is of a similar description.

Steam Pipe Joints.—Many systems are in use for making the joints of steam pipes; one of the most common is a simple red lead cement applied to the surfaces of the flanges, but in these cases the surfaces must be perfectly true and fitted together with the file; if this is done the results are excellent, the only defect being the difficulty in breaking the joint again if it should be necessary to dismount the pipe. For this reason for joints of pipes which are liable to be frequently dismounted preparations of asbestos cloth or paper are used; the latter, however, has the defect that it deteriorates by the action of water, and causes corrosion of the iron bolts, so that when it is employed it is necessary to use bronze instead of steel or iron bolts. Metallic jointing materials are much in vogue, consisting of a simple ring of copper or lead or a tubular ring of copper with an asbestos core. These are inserted between the flanges of the pipes, a small channel being cut in the faces of the flanges inside the bolts to receive them. In our navy, on engines of the Shichau type, the system

FIG. 27.

STEAM PIPE WITH SPIRAL SEAM.
"CLINCH JONES" SYSTEM.

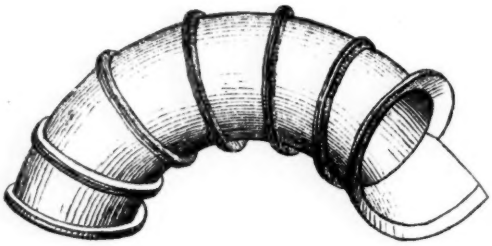
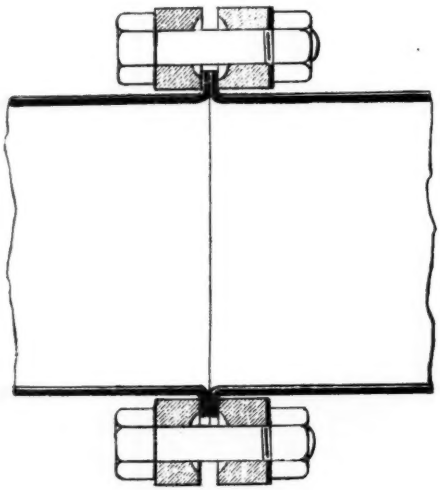


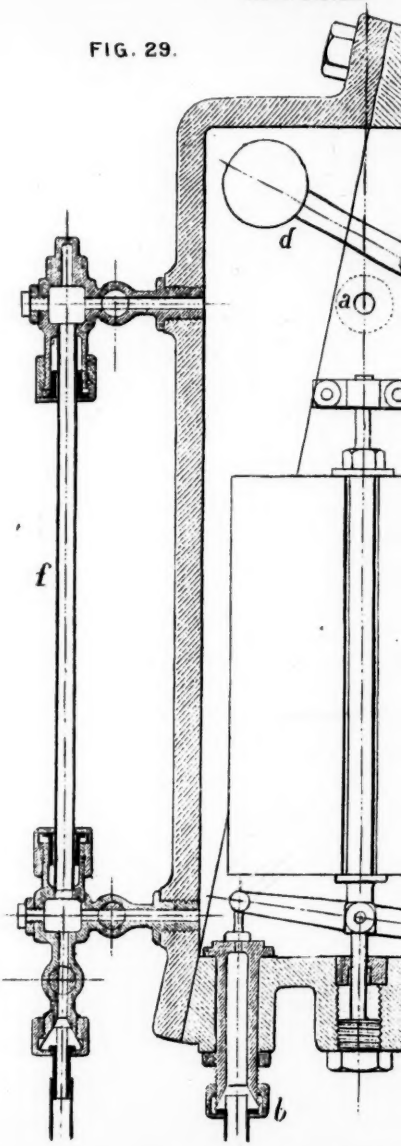
FIG. 28.

STEAM PIPE JOINT. "POPE" SYSTEM.



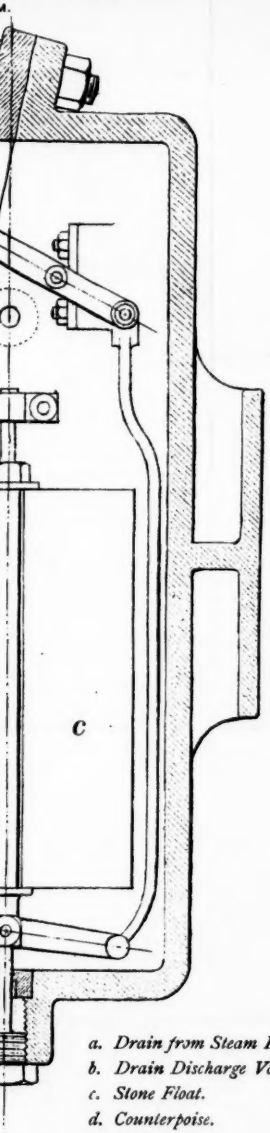
AUTOMATIC DRAIN TANK FOR STE
FOLEY SYSTEM.

FIG. 29.



Harrison & Sons, Lith. 3 Martins Lane W.

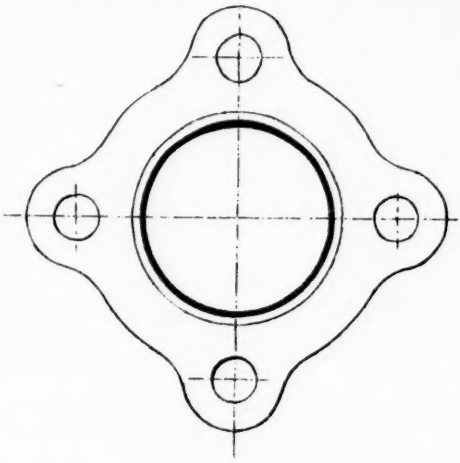
R STEAM PIPES.

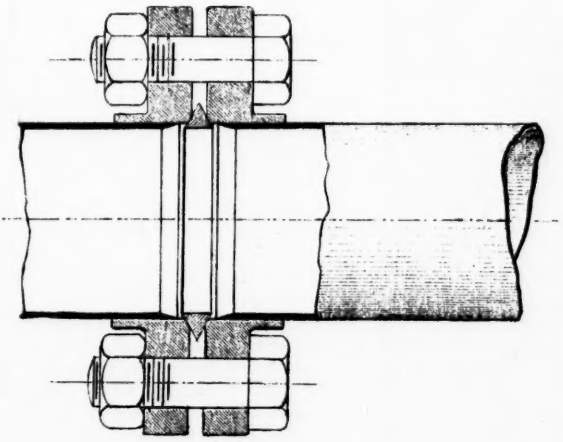


a. Drain from Steam Pipe.
b. Drain Discharge Valve.
c. Stone Float.
d. Counterpoise.
f. Water Gauge.

FIG. 30.

METALLIC STEAM PIPE JOINT.
"SCHICHAU" SYSTEM.





shown in Fig. 30 gives very good results, in which the jointing ring is triangular in section, and forms the seating for the flanges of the pipes. Metallic jointing is very durable, and has the advantage that it renders the operation of readily dismounting and replacing the pipes a simple and easy one. Copper would seem to be preferable to lead for this purpose.

General Arrangement of the Steam Pipes.—In order that the boilers in each compartment may be as independent as possible, and that accidents to the boilers in one may not prevent those in another compartment being serviceable, it is usual to fit separate steam pipes to each compartment, so that the steam from the boilers in each compartment is led to the engine room by its own pipe. In the engine room these pipes lead by means of sectional stop valves into a main receiving pipe, which is also fitted with a stop valve opening against the pressure, so that it may be closed with ease and promptitude, and is so fitted that it can be worked either from the engine room platform or the battery deck; it has also a small valve by which the pressure on each side of the large valve can be equalized, and so facilitate the operation of opening this main valve. In general the pass valve is so geared that it opens automatically during the operation of opening the large valve. As these principal stop valves enable the communication between the boilers and the engines to be rapidly cut off in case of any accident to the latter, the fittings to enable the boiler stop valves to be closed from the deck are in my opinion superfluous, for reasons which I have already given in dealing with this subject. Some years ago, in order to simplify the arrangements, the auxiliary steam service was made a branch connection from the main steam pipe, but experience has shown that this system has the great disadvantage that the main steam pipes, &c., are called into action for the secondary service on board ship, which in modern ships is continuous both in harbour and at sea. For this reason in more recent ships the ancient practice has been again resorted to of having an entirely separate arrangement of auxiliary steam pipes, and, in order that any boiler may be used if circumstances should require it, an auxiliary stop valve connection is fitted to each of them. In twin-screw ships of certain dimensions which have a duplicate service for all requirements, and especially when these are separated by a middle line bulkhead, it is well that the auxiliary steam pipes should form a closed circuit, so that in case one of the compartments is flooded it can be entirely cut off without interfering with the steam supply from the others. To obtain this, it is of course necessary that the auxiliary steam pipe should have stop valves at appropriate parts of its length, and also at the various branches which supply steam to the different apparatus on board.

(To be continued.)

THE RUSSIAN NAVAL MANŒUVRES OF 1892.

(Translated by permission from the "Marine Rundschau" by Commander H. GARBETT.)

I. *The Forces engaged.*

THE manœuvres began on the 19th August and ended on the 22nd, as the attacking force had already on the third day fulfilled the duty assigned to it, although it was originally intended that the operations should extend to the 26th August.

The attacking squadron was under the command of Vice-Admiral Kasnakow, and consisted of the following ships:—

Battle-ships.—"Imperator Alexander II," flagship of Commander-in-Chief.
" "Imperator Nikolaj I."
1st class armoured cruiser:—"Gerzog Edinburskij."
2nd class cruisers:—"Najezdnik," "Krejser."
Torpedo-cruisers:—"Vojevoda," "Lieutenant Iljin."
Torpedo-boats, 1st class:—"Revel," "Ročensaljm," "Bierke," "Libava," "Narva," "Lahta," "Kotka."
Transports:—"Samojed," "Artelščik."

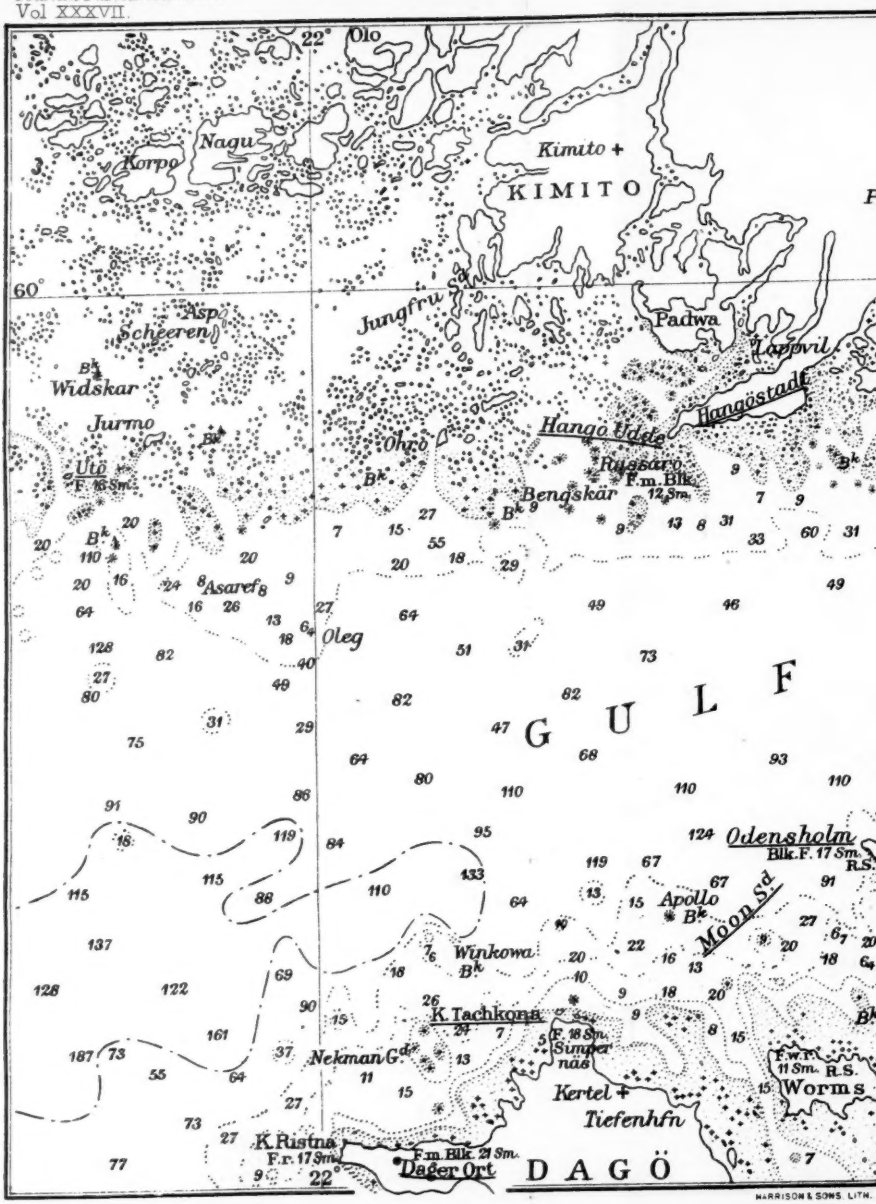
Rear-Admiral Giers was second in command, with his flag flying on board the "Gerzog Edinburskij."

The defending squadron was under the command of Rear-Admiral Gerken, and consisted of:—

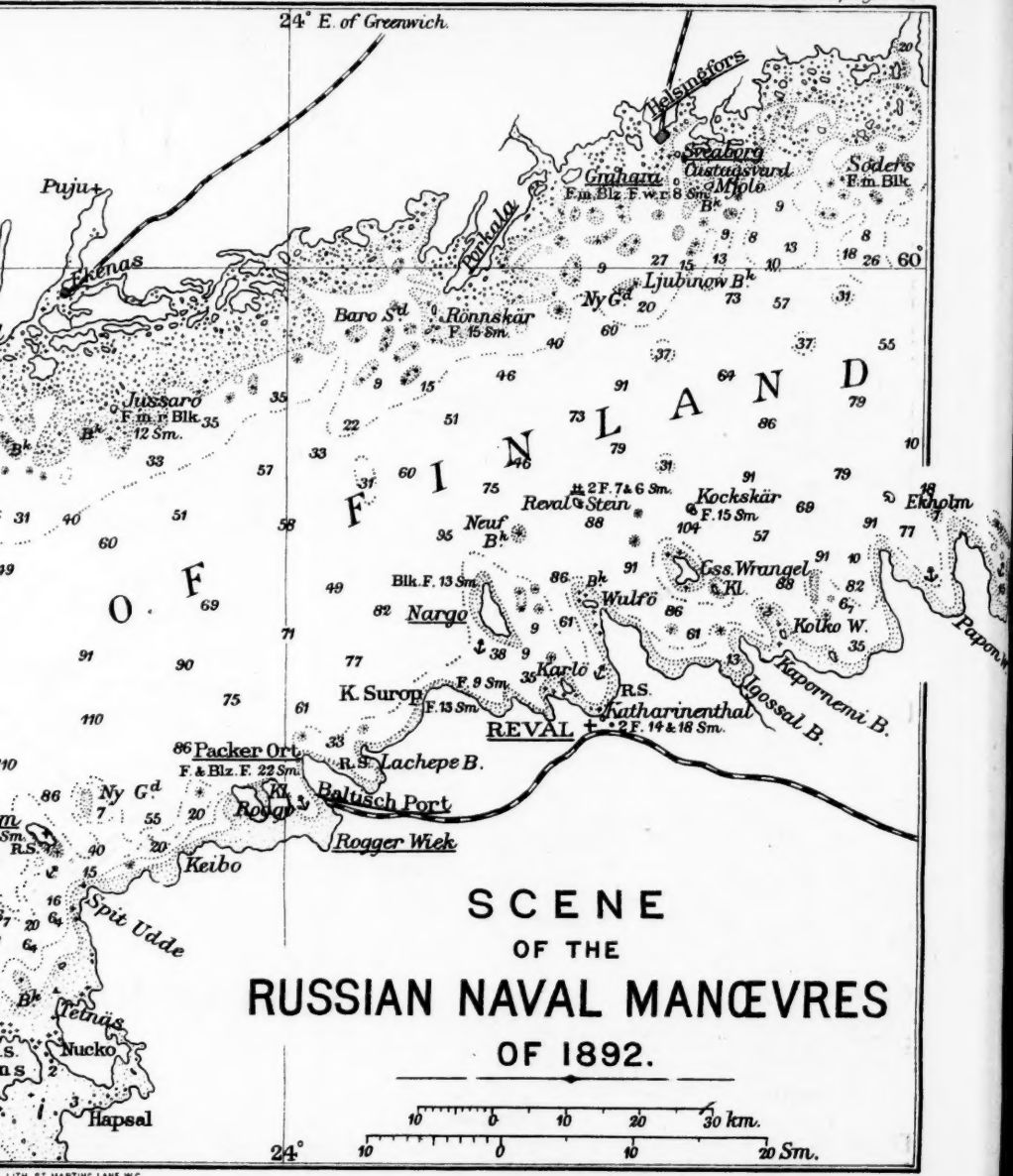
The battle-ship:—"Pjotr Velikij" (flagship).
Coast-defence armour-clad:—"Admiral Lazarev," "Admiral Cičagov," and "Smerč."
2nd class cruiser:—"Opričnik."
Torpedo-cruiser:—"Posadnik."
Armoured gunboat:—"Grozjaščiji."
Coast-defence gunboats:—"Snjeg," "Tuča."
School-ship gunboat:—"Skobelev."
General service steamers:—"Ilmen" and "Slavjanka."
1st class torpedo-boats:—"Vzryv," "Vindava," "Kotlinj," "Luga," "Ekenesj," and "Abo."
2nd class torpedo-boats:—Eight.

The second in command was Rear-Admiral Lazarev.

The Umpire-in-Chief was Vice-Admiral Sterzenkow, who had for his assistant, Captain Lomen; while Rear-Admiral Livron was embarked as Umpire with the attacking squadron, and Rear-Admiral Hiltebrandt with the defending. Each of the last-named flag officers had



HARRISON & SONS. LITH.



LITH. ST. MARTINS LANE, W.C.

two staff officers to assist him. The Umpire-in-Chief was embarked on board the armoured cruiser "Minin."

II.—*The Plan of the Manœuvres and the Manœuvre Regulations.*

The defender received news that the enemy had appeared in the Baltic accompanied by transports conveying a landing corps, which he wished to throw on the south coast of the Gulf of Finland. The defending squadron, sending his scouts to sea, had to follow the movements and discover the plans of the enemy, and to prevent his entering the gulf either unobserved or without loss. The attacking squadron endeavours to force its way from the west, and to land his troops on the south coast; to effect this he must either destroy the defending squadron or closely blockade it.

Before the beginning of the manœuvres, the attacking squadron was to assemble to the south of Cape Dagerort, while the defending force took up its station at some point on the north coast of the Gulf of Finland. For this purpose, at daybreak on the 17th August the attacking fleet left Transund, and on the evening of the 18th the defenders steamed out of Helsingfors. At the conclusion of the manœuvres the whole force was to assemble at Biorke, in order to hear the decision of the Umpire as to the results.

The manœuvres began on the 19th August at 6 A.M., and were to end at midnight on the 25th.

Coefficients of value according to their relative strength were apportioned to each ship as follows:—

Defending squadron—	
"Pjotr Velikij"	12
"Admiral Cičagov"	6
"Admiral Lazarev"	9
"Skobelev"	6
"Smerč"	4
"Opričnik"	5
"Grozjaščiji"	4
"Snjeg"	2
"Tuča"	1½
"Posadnik"	0½
	50
6 1st class torpedo-boats.	
6 2nd " " "	

Attacking squadron—	
"Imperator Alexander II"	22
"Imperator Nikolaj I"	22
"Gerzog Edinburskij"	16
"Najezdnik"	5
"Krejser"	4
"Vojevoda"	0½
"Lieutenant Iljin"	1½
	71
7 1st class torpedo-boats.	
Transports: "Artelščik," "Samojed."	

The defending force had the use of the telegraph and signal stations along the coast for obtaining and conveying information, while the attacking squadron was only allowed to obtain news through the activity of the scouting vessels.

III. *The Manœuvres.*

The defenders began their preparations before the 19th August. The engineers' steamer "Mineur" proceeded from Cronstadt with men from the fortress company to Reval, who connected the islands

Nargen and Eckholm with the mainland by means of a cable 35 km. long, while the defending squadron steamed to Sveaborg and remained there until the beginning of the operations. The "Samojed" also put to sea on the 18th August, laden with coals for the use of the attacking force.

The attacking squadron lay at Transund until 6 P.M. of the 17th, when they weighed and steamed in two columns of divisions in line ahead to the west, leaving the torpedo-boats at anchor with sealed orders.

As arranged, the heavy ships of the squadron found themselves at 6 A.M. on the 19th some miles to the southward of Dagerort, having been previously joined by the "Samojed"; here also the torpedo-boats rejoined, which had left Transund, in accordance with their orders, early the day before, and the whole squadron proceeded at midday to Utö, which roadstead had been selected as the base of operations. A look-out station was established on the lighthouse, and at night-time guard-boats were stationed and torpedo-nets rigged out. The torpedo-cruisers and torpedo-boats were divided into three groups and told off for look-out and scouting duties. The first group consisted of the "Lieutenant Iljin" and two boats, the second of the "Vojevoda" and two boats, and the third of three boats, under the command of the Grand Duke Michael, who was embarked on board the "Reval."

On the first day, the 19th, the second and third torpedo divisions were sent to reconnoitre along the north coast. They were ordered to proceed off Sveaborg, and to endeavour, if they met the enemy at sea, to draw him within range of the guns of the "Imperator Nikolaj I," which, with two boats of the first division, was to cruise between Dagö, Odensholm, and the Moon-sound. The ironclad was also directed to reconnoitre Port Baltic, to clear the entrance of mine obstructions and to capture any hostile avisos.

In the course of the 20th the torpedo-boats returned from their reconnaissance. The Grand Duke returned first, and reported that at 3 A.M., off Grähara, he had fallen in with the cruiser "Opričnik," and succeeded in blowing her up with a torpedo. He had also ascertained that the defending battle-ships, "Pjotr Velikij," "Admiral Lazarev," and "Admiral Čičagov" had left Sveaborg; as he considered he had carried out his orders, he returned to Utö, while the "Vojevoda" remained behind, to follow the hostile armour-clads.

Off Porkala Udd, the torpedo-boats "Reval" and "Bierke" exchanged shots at long range with the "Grozjaščiji," which came up from the southward; they next met the enemy's torpedo-boat "Luga," accompanied by a 2nd class one, which they attacked, bringing them under a cross fire. In the afternoon the "Libava," and, towards evening, the "Vojevoda," with the "Lahta," also arrived. The commander of the "Vojevoda" reported that, after the departure of the torpedo-boats, he had remained some time between the Lubimov Shoal and Grähara, and saw a full-rigged ship (probably the "Skobelev") leave Gustavsärd immediately after the battle-ships. After the ships had approached him within about

15 cables' length and he had seen that they were steering a southerly course, he proceeded full speed to the place of rendezvous with the "Imperator Nikolaj I," in order to report the approach of the enemy; after some hours he met her off Odensholm, and made known the result of his reconnaissance. The captain of the battle-ship ordered him to report then to the Admiral that he would continue the cruise, that he had not as yet seen the enemy, and that he had found no mine obstruction in the entrance to Port Baltic.

On the road to Utö, the "Vojevoda" sighted the hostile torpedo-boat "Ekenesj," and immediately gave chase, which the "Ročensaljm," and "Narva" observing, they also steered to cut off the enemy's boat. In spite of all efforts, the "Ekenesj," being inferior in speed to the torpedo-cruiser, was considered to have been destroyed off Packerort, and the "Vojevoda" then rejoined the squadron, having fallen in with the "Lahta" *en route*. It appeared that the "Lahta" had had a narrow escape from capture, as when off Grähara an accident to her machinery compelled her to stop, and just at this time the "Pjotr Velikij" hove in sight, and observing her helpless condition, bore down upon her; but fortunately, before the battle-ship got within range, the damage was made good and the torpedo-boat putting on all steam made good her escape. On the same day the "Ročensaljm" and "Narva" came across another of the enemy's torpedo-boats, but the torpedo-cruiser "Posadnik" coming up to her assistance, they were forced to withdraw.

On the evening of the 20th, all the vessels scouting had rejoined, with the exception of the "Kotka," which separated from her companions and cruising along the north shore fell in, on the 21st, with the "Imperator Nikolaj I."

From the general consensus of the reports it was evident that the defenders had not as yet discovered the position of the attacking force, that they were looking for him at the entrance of the Gulf and had left the south shore unprotected. Everything was quiet at Utö. The torpedo-boats immediately on arrival completed with coal and water and were soon ready for sea again. At midday on the 21st, the whole squadron weighed, left the shelter of the fjords and shaped course in two columns in line ahead for Port Baltic. The battle-ships formed the starboard column, with the "Lieutenant Iljin" and "Lahta" on the starboard beam, the cruisers formed the port column, with the "Reval," "Bierke," and "Libava," on the port beam of the "Gerzog Edinburskij"; the "Vojevoda" was sent to look out ahead. During the afternoon the Grand Duke learnt from a passing merchant steamer that he had seen four miles to the eastward a turret-ship with four torpedo-boats, while another about 8 P.M. reported that he had met seven war-ships about 60 miles to the eastward between Hangö and Porkala Udd. During the night all the ships carried the prescribed lights. The weather was warm, still, and clear. About 8 P.M., when 14 miles N.N.W. of Cape Tachkona, course was shaped N. 60° E. Behind Odensholm some lights were observed, but they soon disappeared; but it turned out later that they were the lights of the "Imperator Nikolaj I," and the torpedo-boats with

her. The "Kotka" received orders to convey instructions to the battle-ships to proceed to Port Baltic and there await the squadron. At 2 A.M. the two cruisers "Najezdnik" and "Krejser" were ordered to proceed in advance and clear the channel of mine-barriers. At 2 A.M. the whole squadron shaped course for Packerort.

At day-break the "Opričnik" was observed far away on the port hand, but she made off at full speed to the E.S.E. At 6 P.M. the "Imperator Nikolaj I" joined the squadron, which at 7 P.M. arrived in Roggerwick Bay; the cruisers had already cleared and marked the channel with beacons. This work had taken two hours, during which time no hostile ship had appeared, nor had any shots from the shore disturbed them. The "Gerzog Edinburskij" and all the small vessels then proceeded into the inner bay and anchored, and at 9 P.M. a landing was effected and the town (Port Baltic) taken possession of. In the meantime the boats of the battle-ships, which were lying to off the entrance, laid out a barrier of mines; as soon as this was completed, the two ships joined the rest of the squadron in the inner anchorage and the beacons were immediately taken up. The look-out post of one officer and five men at Packerort light-house were made prisoners of war and replaced by signalmen from the squadron. The unexpected arrival of the "Umpire-in-Chief" brought the manœuvres to an end; and next day both squadrons assembled in Biorke.

The commander of the defending squadron had concentrated his principal force in Sveaborg, sending out his scouts to Domesnäs and Hangö Udd. Although in superior numbers to the attacking force, yet, ship for ship, the defending squadron was inferior, so that they were not in a position to dare very much. The news of the presence of the enemy at Utö came too late to Sveaborg to allow of any attempt being made to foil the attack on Port Baltic.

The reports which have come to hand about the manœuvres are very meagre, and nothing but the barest details have been allowed to transpire.

However, it is clear that the Russians are sparing no pains to train their fleet to the strategical and tactical work which may be assigned to them in war-time, and they work year after year with this object; and there is no doubt that this systematic schooling of officers and men in all the different eventualities which may occur on what will, in all probability, be the theatre of war can only tend to the best results in the event of war breaking out in earnest.

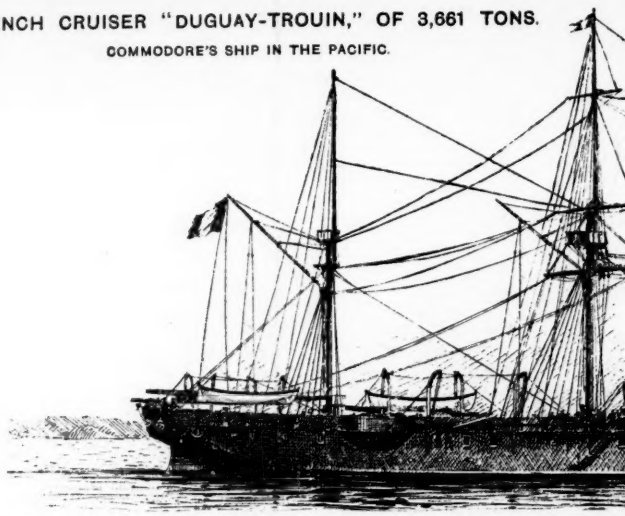
As it may be of interest, I add a short description of the principal ships engaged in the manœuvres. The two battle-ships "Imperator Alexander II" and "Imperator Nikolaj I" are new; the latter was launched in 1889, but only completed for sea last year; they are sister ships, steel and copper sheathed, 326 ft. long, 67 ft. beam, have a displacement of 8,440 tons, and engines of 8,000 I.H.P., with a speed of 15·5 knots. They are protected by a complete, all-round belt of 14-in. compound armour, and their principal armament consists of two 12-in. 50-ton B.L. guns carried in a turret forward, protected

by 10-in. compound plates. They also carry four 9-in. 19-ton guns, two forward and two aft, in a battery protected with 4-in. armour; these guns can be trained to fire right ahead or right astern as necessary; eight 6-in. 6-ton guns; and twenty 6-pr. and 3-pr. Q.F. guns and mitrailleuses, with six torpedo-tubes. The two torpedo-cruisers "Vojevoda" and "Posadnik" are perfectly new vessels, and should more properly be styled torpedo-catchers. They were built by the German firm of Schichau, at Elbing, who have of late years turned out so many successful vessels of this class, and were only completed last summer in time to take part in the manœuvres. They are 193 ft. long, have a beam of 24 ft. 2 in., a displacement of 400 tons, and engines of 3,500 I.H.P. On a three hours' run with forced draught, they attained a speed of 22 knots; with a coal supply of 88 tons, at 14-knot speed, they can cover 2,500 miles. Their armament consists of two 3-pr. Q.F. guns, seven 37 mm. Q.F. guns, and three mitrailleuses, for which a supply of 8,000 projectiles is carried. There are two torpedo-tubes, one in the bow and one on a carriage abaft the funnel. The armoured gunboat "Grozjaščiji" is also new, having been launched in 1890 and completed in 1891. With a displacement of 1,492 tons, she is 229 ft. long, 41 ft. beam, and has engines of 2,000 I.H.P., with a speed of 15 knots. She is protected by a 5-in. armoured all-round belt and 1½-in. protected deck. Her armament consists of one 9-in., one 6-in., and eight Q.F. guns, with two torpedo-tubes. The remaining ships of the squadron may be considered as completely out of date and of little value for fighting purposes against modern vessels, with the exception of the "Gerzog Edinburskij," but her speed, 13·5 knots, is so small as materially to detract from her value. The torpedo-boats have not been taken into account in this description.

H. G.

FRENCH CRUISER "DUGUAY-TROUIN," OF 3,661 TONS.

COMMODORE'S SHIP IN THE PACIFIC.



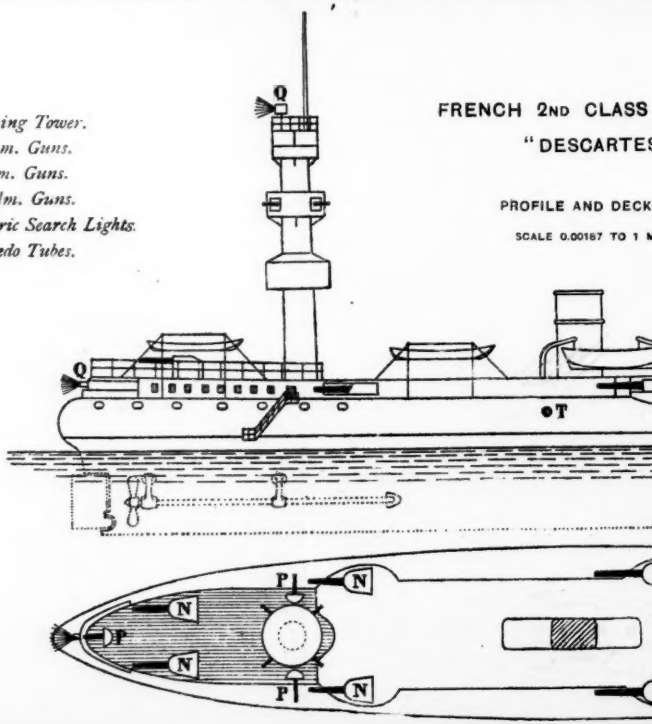
FRENCH 2ND CLASS

"DESCARTES"

PROFILE AND DECK

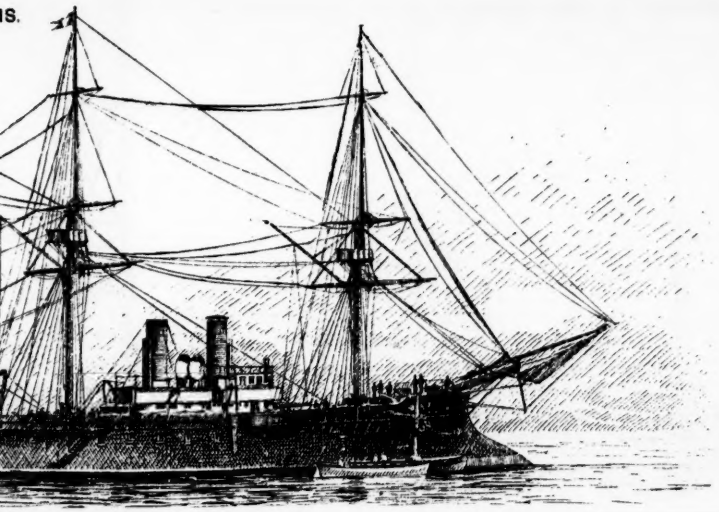
SCALE 0.00167 TO 1 M

B. *Conning Tower.*
M.M. 16 *c/m. Guns.*
N.N. 10 *c/m. Guns.*
P.P. 47 *m/m. Guns.*
Q.Q. *Electric Search Lights.*
T. *Torpedo Tubes.*



HARRISON & SONS, LI

IS.

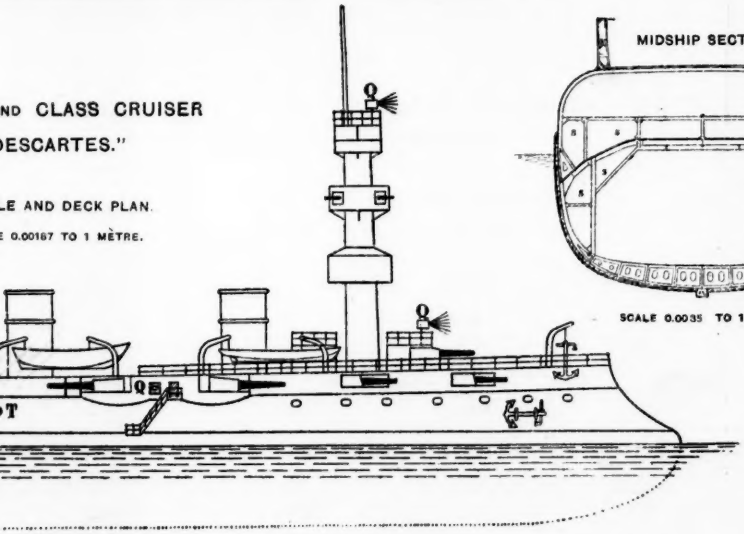


ND CLASS CRUISER

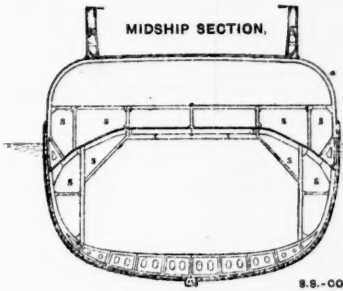
DESCARTES."

LE AND DECK PLAN.

E 0.00167 TO 1 MÈTRE.

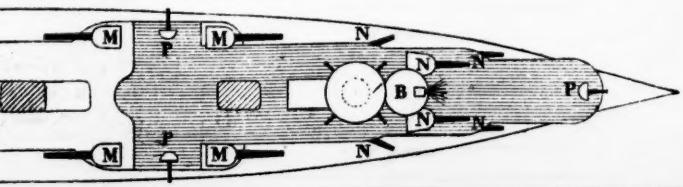


MIDSHIP SECTION.



S.S.-COAL BUNKER

SCALE 0.0035 TO 1 MÈTRE.



HARRISON & SONS, LITH. ST MARTIN'S LANE, W.C.

Hom
it is ho
Compet
conside
the bott

The
service
C. Ber
"Areth
"Phaet
her stat
attached
to relie
as tende

Some
Squadro
battle-sh
"Shann
takes th
2nd cla
at Harv
and re-
guard-sh

The
18th M
ways th
construc
felt by
the con
included
White
Naval
Le Cler
appearan
230 ft. b
water dr
and she
similarit
20 knots
to be 4,5
of power
the use
"Speedy
which a

NAVAL AND MILITARY NOTES.

NAVAL.

Home.—The repairs to the "Howe" seem to be progressing so favourably, that it is hoped she may be ready to leave for England towards the end of this month. Competent experts, who have examined her bottom, since the ship has been in dock, consider her salving a marvellous piece of skill and good work, as one rent alone in the bottom is said to be sufficiently large for a cart and horse to be driven through it.

The 1st class cruiser "Hawke" has been commissioned by Captain Aldrich for service in the Mediterranean; she will take the place of the "Undaunted," Lord C. Beresford, which ship will return to England. The 2nd class cruiser "Arethusa" is also commissioned, by Captain Langley, and will relieve the "Phaeton," a sister-ship, in the Mediterranean. The "Arethusa" leaves direct for her station, but the "Hawke," until after the manœuvres, is to be temporarily attached to the Channel Squadron. The "Barham" has left for the Mediterranean, to relieve the "Landrail," which vessel on her return to England is to be attached as tender to the new School of Gunnery at Sheerness.

Some important changes have been made in the constitution of the First Reserve Squadron. The 1st class belted cruiser "Galatea" takes the place of the 3rd class battle-ship Iron Duke, at Queensferry; a sister ship, the "Aurora," relieves the "Shannon" on the west coast of Ireland; the new 2nd class cruiser "Melampus" takes the place of the old 3rd class battle-ship "Belleisle" at Kingstown, and the 2nd class cruiser "Mersey" is substituted for the 3rd class battle-ship "Hotspur" at Harwich. The small turret-ship "Rupert," which has lately been re-engined and re-armed at Portsmouth, is to take the place of the "Bellerophon" as port-guard-ship at Pembroke.

The new torpedo-catcher "Speedy" was launched on Thursday afternoon, the 18th May, from the yard of Messrs. Thornycroft and Co., at Chiswick. In more ways than one her launch was a noteworthy occurrence in the history of naval construction and naval engineering; and strong evidence was given of the interest felt by experts in the experiments of which she represents the consummation by the constitution of the gathering which was present at the ceremony, which included, among a large number of other guests, Lord George Hamilton, Mr. W. H. White (the present Director), and Sir Nathaniel Barnaby (the late Director of Naval Construction), Admiral Sir A. Hoskins, Rear-Admiral King, Captain Le Clerc (France), and other naval Attachés, &c. The "Speedy" in outward appearance is like other vessels belonging to her class; she is a torpedo-gunboat, 230 ft. between perpendiculars, 27 ft. beam, and of 810 tons displacement at load-water draft. Her armament also will be two 4·7 guns, in addition to smaller guns, and she has three torpedo-tubes, two training and one fixed forward. But here the similarity ends. The estimated speed of the vessel is 22 knots, as compared with 20 knots, the speed of the "Jason" and others of her class; her estimated I.H.P. is to be 4,500, as compared with the 3,500 of her elder sisters, and this great increase of power, which can be developed almost at a moment's notice, is to be the result of the use of the patent water-tube boilers invented by Mr. Thornycroft. The "Speedy" is the first vessel in the British Navy to be fitted with these boilers, which are already in use in several vessels in the French Navy; and, if the results

are equal to the expectations of the designers, it is believed that the art of fitting ships with boilers will be all but revolutionized. Without entering into a detailed description of these boilers, which were described fully in a paper read before the Royal United Service Institution by Mr. John Donaldson, Mr. Thornycroft's partner, in 1889, it may be said that the advantages claimed for them are ease and rapidity in generating steam, ability to stand all temperatures, so that the ship can be stopped or brought up to speed in a few minutes, small weight in comparison with other boilers, and absolute freedom from liability to leakage. The boilers have been tried successfully in the Danish cruiser "Geiser" and elsewhere, and the trial of the "Speedy" is looked forward to with great interest.

During the last month there have been some successful trials of the machinery of new ships. The 1st class cruiser "Crescent," built at Portsmouth, and engined by Messrs. John Penn and Sons, made on the 18th a contractor's eight-hour trial of her engines. Under the new arrangement, vessels of this class, the "Grafton" alone excepted, are not to be tested beyond 10,000 H.P., which is to be obtained with natural draught, for acceptance. The mean results at the end of the trial showed a boiler pressure of 152 lb., a vacuum of 26·6 in., and 97·9 revolutions. The starboard engine developed 5,118 H.P., and the port 5,252 H.P., amounting to a collective I.H.P. of 10,370. These results were obtained without air pressure, the stokeholds not being closed, and with a coal consumption of 1·8 lbs. per I.H.P. per hour. The speed by log was 18·6 knots.

The "Endymion," a sister ship to the "Crescent," which was recently received at Portsmouth from Earle's Shipbuilding Company at Hull, has also completed her eight hours' contractor's trial. Her mean draught at the time was 20 ft. 7 in., or 3 ft. 2 in. less than her proper load draught; and, with 152 lbs. of boiler pressure and 99½ revolutions, the starboard engine indicated 5,261 H.P., and the port engine 5,385 H.P., giving a collective I.H.P. of 10,646. The average vacuum was 27 in., and the speed of the ship by log 20·9; this last, however, can hardly be considered a fair criterion of the speed of the ship, in consequence of her lightness during the trial.

Both of the 1st class battle-ships "Ramillies" and "Empress of India" have concluded their steam trials. The "Ramillies" was drawing 2 ft. less than her proper load displacement, so that her speed cannot be estimated fairly. As regards the development of horse-power and the behaviour of machinery and boilers, everything was most satisfactory. The steam pressure was 149 lbs., and the vacuum 27·8 in., while the engines worked smoothly at 96·7 revolutions per minute. The H.P. developed was 9,415, which exceeded the contract by 415. The coal consumption averaged 1·7 lbs. per unit of horse power per hour, as against 2 lbs. in the case of the "Repulse." During the four hours' forced draught run, the engines developed 12,000 H.P., with an average air pressure of 0·35 in.; the coal consumption averaged 2·17 lbs. per I.H.P.

The "Empress of India" underwent her trials at her future normal draught; during the seven hours' run under natural draught, the mean I.H.P. registered was 9,507, being 507 over the contract power, and the speed attained was 16 knots. The engines averaged 96 revolutions per minute; and the pressure of steam was 148·5 lbs. During the forced draught trial the I.H.P. was 11,625, the steam pressure 150·8 lbs., and the engines worked at 102 revolutions per minute. The speed of the ship by patent log was 18 knots per hour. So far these new battle-ships and 1st class cruisers have all undergone their steam trials with marked success, and there can be little doubt now that the anticipations of the Constructive Department of the Admiralty with regard to these splendid ships will be more than realized, a result which redounds to the credit of the Admiralty and all concerned.

The 2nd class battle-ship "Ajax" and the 3rd class cruiser "Pylades" have been passed into the Fleet Reserve at Chatham. The "Ajax" has been fitted with steel roller plates for her turrets, and her armament has been strengthened by the addition of four Q.F. guns on her upper deck and two additional machine-guns in

her new military tops. The 2nd class battle-ship "Téméraire" has also been passed into the Fleet Reserve at Devonport.

Great efforts are still being made to further overcome leaky boiler tubes by means of different variations of the ferrule. The ferrule has produced excellent results, but it is still regarded as a make-shift rather than as a final remedy. Some experiments have been carried out at Portsmouth with the boilers of the gun-boat "Seagull," although the experiments do not appear to have been carried far enough to fully test the latest development of the ferrule. The new adaptation consists in fitting the boiler tubes at the furnace end with copper sleeves of the same diameter as the tubes. Two of the "Seagull's" boilers were so fitted, and were subjected to a three hours' trial, with satisfactory results. It is claimed for this new development that the ferrules will not need to be renewed so often, and that the tubes can be swept with less difficulty.

Austria-Hungary.—On the 29th April, at Trieste, the armoured ram-cruiser "Kaiserin und Königin Maria Theresa" was launched. She is an improved type of the "Kaiser Franz Josef" and "Kaiserin Elizabeth" class, being 1,000 tons larger and her engines indicating 800 more horse power than the two earlier vessels. Her principal dimensions are as follows: Length 347 ft., beam 52 ft., mean draught 19 ft. 6 in., displacement 5,000 tons; her engines are of 7,000 I.H.P. with natural draught and 9,800 I.H.P. with forced, giving an estimated speed of 17 and 19 knots respectively. She is double-bottomed, with a large number of water-tight compartments. Protection is afforded by an armoured deck with a maximum thickness of 2·3 in., which reaches to 4 ft. below the water-line, in addition to which a complete belt of cellulose runs round the ship. There are two barbettes and a central citadel protected by 4-in. steel armour. The armament will consist of two 24-cm. (9·4-in.) Krupp 35-calibre guns, mounted one in each barbette—these guns will have a firing arc of 240° and are to be worked by electricity; eight 15-cm. (6-in.) Krupp guns, of which four are in protected redoubts, at either end of citadel, and the other four mounted above, also protected by 4-in. shields, and so placed that four can be aimed either fore and aft or on each broadside; two 7-cm. Uchatius guns for the boats, eighteen 47-mm. (3-pr.) Q.F. guns, two machine-guns, and four torpedo-tubes. The ship will be lighted by electricity, will be provided with torpedo-nets, and will carry 740 tons of coal, allowing a steaming radius at 10 knots of 4,000 miles.

France.—A commencement is about to be made at Granville with the new armoured cruiser "Pothuau," which is to be an improvement on the four vessels of the "Charner" type (a description of which was given in the April Notes); she is being laid down on the stocks from which the "Latouche Tréville" was launched not long ago. The new cruiser will have a length of 368 ft., a beam of 49 ft. 6 in., a displacement of 5,245 tons, engines indicating 7,500 H.P. under natural draught with an estimated speed of 18 knots, and 10,000 I.H.P. with forced draught and an estimated speed of 19·5 knots. She will be protected by a complete belt of hardened steel at the water-line, 4 in. thick, in conjunction with a protective deck of a maximum thickness of 3 in., cofferdams filled with cellulose running round the ship, and numerous water-tight compartments. The conning tower will be made of steel armour 9·5 in. thick; and for principal armament the ship will carry two 19-cm. (7·8-in.) guns in closed turrets protected with 4-in. plating, one forward and one aft, ten 6-in. Q.F. guns protected by 3-in. steel shields and screens, sixteen 47-mm. (3-pr.) and eight 37-mm. Q.F. guns, with five torpedo-tubes. It is intended to work the heavy guns and turrets either by electricity or hand. ("Riv. Marittima.")

Among the new constructions sanctioned last year were two 2nd class cruisers, both of which have now been some months in hand; they are sister ships, and are named the "Descartes" and "Pascal"; being intended for service on distant stations, they will be sheathed with teak and coppered, and they are 6 ft. 6 in. longer and some 250 tons larger than the three cruisers of the "Chasseloup-Laubat" type,

a short description of which we gave in last month's Notes. We have taken the following description of the "Descartes" (Plate 21) from the "Yacht." Principal dimensions: length between perpendiculars, 312 ft.; beam, 41 ft.; mean draught, 18 ft. 6 in.; displacement, 3,988 tons; engines, 9,000 I.H.P. under forced draught, and estimated speed 19 knots. The hull is built entirely of steel, with double bottom and the usual water-tight compartments. The vital parts of the ship are protected by an armoured deck which slopes down from the centre to the sides of the ship below the water-line, and varies in thickness from 1 in. in the horizontal portion to 1·8 in. on the slopes above the water-line, diminishing to ½ in. below. Between the armoured and mess decks the ship is divided into cellular cofferdams running fore and aft the whole length of the ship, and which, in the centre part of the ship, serve as coal-bunkers. The engines, boilers, magazines, and shell-rooms are all below the armoured deck, the powder and shells being conveyed to the upper deck through 3·3-in. armoured tubes; a similar tube affords protection to the electric wires, voice tubes, &c., leading from the conning tower to the different parts of the ship, the conning tower being placed in front of the foremost military mast, and protected by 2·8-in. armour in front and 1·8-in. armour behind. There are two military masts with three tops; the lower serves as a look-out post for the commandant, the centre one carries a battery of four 3-pr. Q.F. guns, while the upper carries a search light and two 37-mm. machine-guns. There are two vertical triple-expansion engines, and the ship will carry about 560 tons of coal, which, at 10 knots speed, will give her a range of action of 5,000 miles. Her armament will consist of four 6-in. Q.F. guns, ten 4-in. Q.F. guns, fourteen 3-pr. Q.F. and eight 37-mm. machine-guns, with two torpedo-tubes, which are fitted one on each beam. The four 6-in. guns are mounted in sponsons amidships, covered by the extension of the forecastle, two firing right ahead and two astern; six of the 4-in. guns are mounted on the upper deck, four of them under the forecastle being so arranged as to fire right ahead, while the other two on the quarter-deck can fire right astern; the remaining four are mounted, two on the forecastle and two on the poop. The ship is being built at Saint-Nazaire, in the yard of the Société Anonyme des Ateliers et Chantiers de la Loire," the officials of the firm being responsible for her design. When complete, the cruiser will have to undergo a forced draught trial of four hours, when the engines will have to develop 9,000 I.H.P., and the speed ought to be 19 knots; a natural draught trial of six hours; a 24 hours' run with the engines developing 5,500 I.H.P., and two runs, one at a speed of 10 knots and the other with 8,500 I.H.P., to determine the consumption of coal per indicated horse power.

The 1st class barbette cruiser "Isly," a sister ship to the "Alger" and "Jean-Bart," has been carrying out her trials off Brest, before her engines are taken over from the makers, Indret et Cie. They seem to have been on the whole very satisfactory, although the anticipated speed of 19 knots under forced draught was not attained. Using six boilers out of her ten, she maintained a speed of 15 knots for six hours, and, during a natural draught trial of six hours, she easily maintained a mean speed of 17·9 knots. On the 17th May she made her forced draught trial, Rear-Admiral Courtheille and the other members of the Naval Commission being on board. The day, however, was unfavourable; there was a fresh S.E. breeze, with a long swell on, which made the cruiser pitch heavily; the engines developed 8,100 I.H.P. (100 H.P. over the contract), yet a speed of only 18·1 knots was reached, although the revolutions of the screws (120 a minute) should have given 18·5 knots. The trials have lasted hardly six weeks, and the "Yacht" notes this as a very satisfactory result, as in France now for some years they have been accustomed to see the trials of new ships extending over a year or more, with numerous break-downs. The "Isly" is to be taken into dock to have her screws changed, when some fresh trials will be made. ("Le Yacht.")

The armoured cruiser "Dupuy-de-Lôme" has also commenced her trials off Brest. She has three sets of engines and three screws, and during her first trial, with less than 4,000 I.H.P., a speed of 14·5 knots was obtained: on her second trial

on the 16th May, with the engines indicating 9,500 H.P., she made 18·4. It is therefore confidently expected that her speed under natural draught will be 19 knots, and as, under forced draught, the engines are to develop 14,000 I.H.P., it is hoped that her maximum speed will prove to be 21 knots. The same day the trials of her guns and gun-mountings were successfully carried out. Five rounds with the highest charges were fired from each 19-cm. (7·8-in.) and the 6-in. Q.F. guns; the maximum training in each direction was given, the object being shifted after each round. The hydraulic fittings worked well, and no damage was done to either deck or hull. The rapidity of fire of the guns in the turrets left nothing to be desired; practically, good gunners will easily fire one round from the 19-cm. guns and three from the 6-in. Q.F. guns in a minute, including training the guns on a fresh object. ("Le Yacht.")

The firm of M. Normand, of Havre, have scored another brilliant success in the recent trial of the new torpilleur-de-haute-mer "Lancier," which maintained the high speed of 25·8 knots, being half a knot more than was obtained by the "Grenadier." The "Lancier" is 138 ft. long, 13 ft. beam, has a draught of 7 ft. 6 in., and her engines develop 1,250 I.H.P. She is now being got ready for sea, when she is to join the Northern squadron, under the command of Vice-Admiral Lefèvre, who will thus have under his orders two of the fastest vessels which have as yet been built for any navy. Up to the present the Schickau firm at Elbing have carried off the palm for speed in torpedo-boats; their two latest, the "Adler," built for Russia, and the "Aquila," for Italy, having maintained a speed of 27·4 knots. The Spanish boat "Ariete," built by Messrs. Thornycroft, with a speed of 26·4 knots, comes next, after which may be reckoned the "Lancier," "Corsaire," and the other new Normand boats. ("Le Yacht" and "Le Petit Var.")

On the 16th May, at Lorient, the coast-defence battle-ship "Tréhouart" was successfully launched. She is an improved "Furieux," and is one of four vessels which originally were intended to be identical, the other three being the "Bouvines," "Jemmapes," and "Valmy"; as her design has, however, undergone important modifications, we shall refer on another opportunity to this ship and her sisters.

The 2nd class barbette cruiser "Duguay-Trouin," which left Cherbourg about six weeks ago to take the place of the 2nd class battery-cruiser "Doubourdieu" as senior officer's ship in the Pacific, is a handsome barque-rigged vessel of 3,661 tons (Plate 21). She is of iron, but sheathed with wood, and, although launched as long ago as 1877, is still a very useful vessel, but is hardly a cruiser in the now accepted sense of the term. She is 295 ft. long between the perpendiculars, 42 ft. 6 in. beam, with a mean draught of 18 ft., engines of 4,400 I.H.P.. and a speed of 15·8 knots. Her armament consists of five 16-cm., five 14-cm., and four 3-pr. Q.F. guns, five machine-guns, and two torpedo-tubes. ("Le Yacht.")

Germany.—The gun trials with a new explosive substance, which commenced at Jüterbogk on January 31st, have now been concluded, and a few further details regarding the result of the experiments and the composition of the explosive, which it is expected will replace the powder at present in use in Germany, have been published in Berlin and may be added to the account given in last month's Military Notes. The new explosive, according to a Reuter's telegram to the "Times," is chiefly composed of a kind of fatty substance, and is of a brownish colour. It is of the consistency of frozen olive oil, and remains in that condition up to a temperature of 50° C. The substance, which is the invention of Dr. Weiss, of the Gera Dynamite Factory, explodes neither by a blow, a shock, nor a spark, but by the introduction of a fresh substance. The explosion is almost smokeless, and produces very little detonation. The trials have, it is said, given most successful results. There is practically no recoil, even when the gun is loaded with a heavy charge, and there is scarcely any heating of the weapon. The used cartridge cases can be filled again by a simple method. The new explosive can be used for the existing

artillery, but is not adapted to the infantry rifle at present in use. Four new models of rifles have, however, been constructed, and trials have been made with them.

Russia.—The plans of a large cruiser of the "Rurik" type have lately been submitted to the Russian Naval Technical Committee. This new vessel, which will be built at the Baltic Works, will be 10 ft. longer and 4 ft. more beam than the "Rurik." A third cruiser of 14,500 tons displacement is also to be constructed at St. Petersburg. The vessel is to be furnished with three engines, each of 5,000 I.H.P., and three propellers. It is expected that each of these cruisers, which will carry an enormous supply of coal, will attain a speed of 19 knots under ordinary draught. ("Kronstadtski-Viestnik.")

Sweden.—The Naval Commission which was specially appointed to report on the most useful types of ships for immediate construction has decided in favour of a class of ironclads displacing about 4,000 tons, and carrying two 10-in. guns in barbettes, four 4·7 Q.F. guns, two on each broadside, and ten smaller quick-firing and machine-guns; a 1st class of torpedo-boats displacing about 90 tons; and a 2nd class capable of passing through the canal between Stockholm and Göteborg. The Commission also recommends the building of one cruiser of moderate dimensions and one transport, and calls attention to the necessity for perfecting the arrangements for the coast defence of the country.

United States.—The "Deutsche Heeres-Zeitung," Nos. 28—29, calls attention to the remarkable development which has taken place in the American navy during the last four years. It points out how for years it was a source of wonderment that a nation so wealthy, and with so important an extent of coast line, should yet have been content with a fleet which was scarcely sufficient for the protection of its diplomatic and commercial interests abroad. In the year 1889 the United States possessed only three ships which could lay claim to being considered modern: these were the two 1st class protected cruisers "Atlanta" and "Boston" and the dispatch vessel "Dolphin"; the rest of the fleet consisted of old vessels, insufficiently armoured, of small engine power, and with faulty armaments. This sloth in naval matters, inexplicable as it seemed, was only apparent; in reality the Government were biding their time, they saw that no finality had been reached either in guns, armour-plating, or machinery, and for twenty years they were content to allow European nations to carry out costly experiments while they held aloof and watched the results. Naval experts were sent to study and examine the dockyards and arsenals of the great maritime Powers, and with untiring zeal the different systems of coast defence, of naval construction, of armour-plating, and of the manufacture of guns, powder, &c., were weighed and sifted, until the necessary data were collected from which the building of a perfectly modern and efficient fleet could be proceeded with. This delay for observation has been attended with important results in another direction. Twenty years ago the United States were not in a position to produce heavy armour-plates or the great steel forgings necessary in the manufacture of modern ordnance; the art of iron shipbuilding and marine engineering, as it is understood in these days, was in the States in its infancy; now all this has changed, and so carefully have the great industries been fostered by the Government, that the great iron and steel works of Carnegie & Co., the Bethlehem Iron Works, the shipbuilding firms of Cramp & Co., in Philadelphia, the Union Iron Works of San Francisco, and others, can already hold their own with the great firms in England, France, and Germany; and the new navy, including guns, is being constructed entirely of native materials and by native industry.

We have said that in 1889 the United States only possessed at sea three modern ships; their fleet since then has been increased by the following vessels:—The double-turret coast-defence armour-clad "Miantonomoh," of 3,990 tons, which was commenced as long ago as 1876, but work on her was stopped, and she was only launched in 1889, and completed last year; she has a water-line belt of 7 in., while her turrets are protected by 12-in. armour; her machinery is very small, only indicating 1,426 H.P.; she carries four 10-in. guns in her turrets, four 6-in., and

some smaller guns: the coast-defence armour-clad "Monterey" of 4,440 tons and 5,450 I.H.P., launched in 1891, and with a speed of 16 knots; this ship has a complete water-line belt of 13-in. steel armour, and the same on the turrets, in which are mounted two 12-in. guns in the forward one, and two 10-in. in the after; she has in addition six 6-in. and six Q.F. and machine guns: the armoured cruiser "New York," a vessel of 8,150 tons and 16,500 I.H.P., which has lately averaged over 20 knots in her trial trips: the 1st class protected cruisers "Chicago," "Charleston," "Baltimore," "Philadelphia," "San Francisco," and "Newark," varying from the displacement of 3,730 tons in the "Charleston" to 4,500 in the others, and from engines of 5,248 I.H.P. in the "Chicago," with a speed of 16 knots, to 10,500 I.H.P. in the "Baltimore," "Philadelphia," and "San Francisco," with a speed of 20 knots: the 3rd class cruisers "Detroit," "Montgomery," "Concord," and "Bennington": the torpedo-cruiser "Yorktown": the gunboats "Petrel" and "Machias": the sea-going torpedo-boat "Cushing" and dynamite cruiser "Vesuvius"—a total of 19 vessels with a displacement of 54,382 tons, and carrying two 12-in., six 10-in., 16 8-in., and 22 6-in. guns, besides a large number of small Q.F. and machine guns.

In addition, there are building or fitting out the battle-ships "Oregon," "Indiana," "Massachusetts," "Maine," "Iowa," and No. 2; the coast-defence armour-clads "Terror," "Amphitrite," and "Monadnock"; the armoured cruiser "Brooklyn"; the 1st class protected cruisers "Columbia," "Olympia," "Cincinnati," "Raleigh," and "Minneapolis," two of which, the "Columbia" and "Minneapolis," are of 7,500 tons and have engines of 23,000 I.H.P.; the 3rd class cruiser "Marblehead"; the ram "Katahdin," and torpedo-boat No. 2. Of these the battle-ships, No. 2, the "Iowa," and the "Brooklyn" are the latest. A full description of the "Brooklyn" was given in the March number of the Journal. The American navy has three different kinds of torpedo, of which the Howel is the best; the torpedo system is not as yet finally decided upon. The fleet has a double duty to perform on the Atlantic and Pacific Coasts, and, until the Panama Canal is built, a concentration of the fleet will be difficult. This has been fully recognised at Washington, so that no sacrifice is now wanting to increase the fleet, and there is no doubt that it will soon be worthy of the American nation, and rank high even among those of the great European navies.

It may be interesting to record a list of the ships which took part in the Columbus celebrations at New York at the opening of the Chicago World's Fair last month. The whole of the ships left Hampton Roads and steamed to their position off New York in the following order:—Port Column: United States—"Philadelphia," flagship of Rear-Admiral Gherardi in command, "Newark," "Atlanta," "San Francisco," "Bancroft," "Bennington," "Baltimore," "Chicago," "Yorktown," "Charleston," "Vesuvius," "Concord"; Argentine Republic—"Nuevo-de-Julio," flagship of Rear-Admiral Howard; Holland—"Van Speyk," 1st class cruiser; Germany—"Kaiserin Augusta" and "See Adler"; and United States—"Miantonomoh." Starboard Column: British—"Blake," flagship of Vice-Admiral Sir J. Hopkins, "Australia," "Magicienne," and "Tartar"; Russia—"Dimitri-Donskoi," flagship of Vice-Admiral Kaznakoff, "General-Admiral," and "Rynda"; France—"Aréthuse," flagship of Rear-Admiral De Libran, "Jean-Bart," and "Hussard"; Italy—"Etna," flagship of Rear-Admiral Magnaghi, "Giovanni Bausan," and "Dogali"; Spain—"Infanta Isabel," flagship of Rear-Admiral Gomez y Lomo, "Reina Regente," and "Nueve Espana"; Brazil—"Aquidabran," flagship of Rear-Admiral de Noronha, "Tiradentes," and "Republica." Of these ships, only two, the United States ship "Miantonomoh" and the Brazilian "Aquidabran," are ironclads; three, the British "Australia," and the Russian "Dimitri-Donskoi" and "General-Admiral" are belted cruisers, and all about the same tonnage, but the protection in the three ships is different; while the "Australia" has a partial belt ($\frac{2}{3}$ of her length) of 10-in. armour, the two Russian ships have a complete belt 6 in. thick, but nearly 3 ft. wider than in the "Australia." The "Australia" carries two 9·2-in. guns, one forward and one aft, with steel shields, and ten 6-in. with 16 Q.F. guns and four torpedo-tubes. The "Dimitri-Donskoi" carries two 8-in. forward in turrets protected by 12-in. armour,

twelve 6-in. guns and 20 Q.F. guns, with 4 torpedo-tubes; the "General-Admiral" is armed with six 8-in. guns with shields, two 6-in., 16 Q.F. guns, and two torpedo-tubes. Of the remainder, the "Aréthuse," the French flagship, is a full-rigged cruiser of a type now out of date except for training purposes, while, with one or two exceptions, the rest of the ships are modern cruisers of the protected type, the finest of which by far was the English "Blake." It seems to be generally conceded by the American press that the English squadron on the whole carried off the palm. They were the only ships which arrived at Hampton Roads as a squadron, and the way the squadron was handled and the accurate station kept by the ships was the theme of universal praise by the foreign officers who witnessed its arrival. At the naval parade on shore, the fine appearance of the blue-jackets and marines and their excellent marching were much admired, and here the French and Russian landing parties came in for a full share of praise and applause. On the illumination of the fleets in the evening, the English squadron again excelled, the hulls of the ships in the first place, with their funnels, being outlined at the water-line and upper works by rows of incandescent lights. The largest number of visitors flocked to the "Blake," and this is not to be wondered at, for she was by far the largest ship there, and being in excellent order was a splendid show ship of what a man-of-war can be. We envy the officers and men of our squadron who were so fortunate as to take part in this historic celebration.

MILITARY.

Home.—The War Office are about to make a new departure by the publication under official sanction of a book descriptive of the army system and its antecedent history.

The publication of this "Army Book for the British Empire" will supply an undoubted want. Hitherto there has existed nothing of the kind, and a would-be student of our army system has been compelled to wade through endless committee reports and blue books, and even then has probably been unable to discriminate between the existing and the obsolete. In this respect the officers of the army have been little or no better off than the general public.

The "modern system," as it may be termed, has now been working for over twenty years, during which much has happened, and this has especially been the case during the past year, which has given us for the first time a really serious and practical scheme of mobilization for home defence, workable and working. We have had time to learn the difficulties attendant on army administration and how they can be overcome, and if the promised "Army Book" will now indicate these, and not give a mere outline of the system, it will prove the more welcome.

The duty of editing the book has been entrusted to Lieut.-General W. H. Goodenough, C.B., and Lieut.-Colonel J. C. Dalton, who will be assisted by various officers, many of high standing and known repute, and all eminently capable of doing justice to the special subjects with which they deal.

As our whole service is based on the voluntary system, we must rely for its maintenance on the interest, good will, and support of our entire community; hence it will be sought to give this book, which will deal with principles rather than detail, a distinctly readable character. Avoiding the stiffness of some foreign publications of a generally similar import, it will trace the development of the present form of the army through the course of its history, and treat such of the matter as must of necessity be somewhat dry and technical in, at least, a spirit of common sense.

The book will be in four parts:—

I. The army system,
II. The components of the army,
III. The army in India and the Colonies,
IV. The army in war,

and will be illustrated with maps.

We regret to have to record the death, on the 28th May, of Commander Ewald von Kries, Military and Naval Attaché to the German Embassy in London. The painful impression created by this sad event is emphasized by the fact that this distinguished officer had, only a few months ago, arrived in London to take the place of his predecessor, Commander Hasenclever, who died in this country last summer.

Austria-Hungary.—It is stated that the question of materially augmenting the field artillery has recently been seriously entertained in the military councils. It is understood that the proposed increase will amount to 224 guns, and will not be completed before 1896. When realized, each division of the army will have 32 pieces at its disposal, the landwehr divisions disposing only of 24 guns.

The artillery non-commissioned officers' schools are in future to be conducted by batteries or companies, and not by larger units. The instruction, which is to be given personally, and superintended by the battery and company commanders, will, as heretofore, comprise the study of the regulations for interior economy and drill, gun practice, military organization, armament, veterinary art, &c., and will further include field service, as prescribed for the cavalry non-commissioned officers' schools.

The engineer arm of the service ceased to exist on the 1st May. From that date the engineers, which have hitherto been placed directly under the War Minister, and the pioneers, which have been under the orders of the Chief of the Staff of the army, are under the immediate orders of an Inspector-General of Pioneers. The seven battalions of pioneers retain their former numbers, 1 to 7, while the two former regiments of engineers become the 8th to 15th battalions of pioneers. Thus, each of the 15 battalions corresponds to an army corps. Each battalion of the pioneers has hitherto consisted of 4 field companies and 1 reserve company; these titles now disappear, and the five companies are simply numbered 1 to 5. The reserves of tools and cadres of depôt companies remain as before, so that there are now in all 70 companies of pioneers, 15 cadres of depôt companies, and 7 reserves of matériel. The war bridge equipment is to be maintained in peace by the first seven battalions, the other battalions having only instructional bridge equipment. In making his final inspection in April last, as chief of the regiment of pioneers, the Chief of the Staff is reported by the "Revue du Cercle Militaire" to have expressed himself as follows: "Modern war, with the enormous armies now put into the field, the great mobility which it requires, and the diminished importance of fortress warfare, has made the unification of the technical troops of any army both necessary and possible. The fusion of the pioneers with the engineers had, therefore, become indispensable, and it will be promptly carried out with the greatest advantage to the army."

The "Revue du Cercle Militaire," No. 22, gives a short description of a new field hospital, invented by Dr. Hofgräf, one of the chief recommendations of which is, that it can be put up in an hour by eight men. It appears to be entirely built of light panels, which are interchangeable, and requires no tools for its erection.

Bulgaria.—The reorganization of the Bulgarian army, which commenced last year, will be completed before the close of 1893. The following details are taken from the "Militär-Wochenblatt."

The land forces consist of three categories: Active Army, Landwehr (Reservna Armia) and Landsturm (Opoltschenije).

In peace-time fixed nuclei are maintained for the active army and landwehr, termed the permanent troops and the reserve nuclei respectively; for the landsturm there is no nucleus in peace-time. The term of service in the infantry is 2 years in the permanent troops and 8 years in the reserve; for other arms, 3 and 6 years respectively. In the landwehr the term is 7 years for all arms. In the landsturm the infantry serve 8 years (4 in each ban); the other arms serve 9 years (4 in the 1st, and 5 in the 2nd ban).

The permanent troops of the active army consist of:

a. 6 infantry divisions, each comprising 4 infantry regiments (each of 2 battalions of 4 companies), 1 squadron divisional cavalry, 1 artillery regiment of 5 field batteries (each of 4 guns), and half a mountain battery (2 guns), 1 train company, 1 divisional hospital, &c.

b. 1 cavalry division of 4 regiments (each of 4 squadrons).

c. 1 body-guard squadron.

d. 1 pioneer brigade of 3 battalions (each 4 companies), 1 railway, 1 telegraph, and 1 pontoon company.

e. 2 fortress battalions of 3 companies each.

f. 2 artillery depôts.

The reserve nucleus of the landwehr in time of peace consists of:

a. 24 infantry regiments, of 3 companies; 4 regiments being attached to each of the 6 infantry divisions.

b. 6 batteries of 8 guns each, 1 to each infantry division.

In time of war the active army can be raised to 6 infantry divisions (each consisting of 30 battalions infantry, 1 battalion pioneers, 5 8-gun batteries, 1 6-gun mortar battery, and 1 mountain battery), 1 cavalry division of 4 regiments (each 5 squadrons), and 3 battalions of 4 companies each of fortress artillery, besides complete auxiliary services.

The landwehr consists of 6 infantry divisions, each of 4 infantry regiments of 4 battalions, 1 field artillery regiment of 6 4-gun batteries and a mountain 4-gun battery, 2 or 3 squadrons divisional cavalry, 1 pioneer company, 1 train battalion, with artillery park and complete medical and supply services.

The landsturm consists exclusively of infantry. The men of the 1st ban can, if necessary, be employed outside their own district; those of the 2nd ban only in their own district. Each ban consists of 24 battalions.

Thus, exclusive of auxiliary services and fortress guns, and reckoning the battalions at 1,000 men and the squadrons at 150 horses, the new organization will enable Bulgaria, in round numbers, to put the following forces on a war footing:—

Active Army	120,000	men,	5,850	horses,	312 guns.
Landwehr	96,000	„	2,700	„	186 „
Landsturm	48,000	„	—		—
Total	264,000	men,	8,550	horses,	498 guns.

France.—"La France Militaire" gives the following details regarding the proposed law for the formation of a colonial army. The fundamental principle is accepted that the service shall be voluntary. The ranks are to be recruited (*a*) from men who may offer themselves either before or after reaching the age of liability to military service, (*b*) from re-engaged men, and if these are insufficient to complete the establishment, (*c*) from men who may volunteer while serving with the colours. If there are not sufficient colonial troops for foreign operations, they may be taken from the Foreign Legion. Corporals and men of the colonial army, after 15 years' service, are to have a claim to a certain number of civil and military appointments in the home country and in the colonies, and married men may receive grants of land in Algeria.

Only a limited number of cartridges with smokeless powder will be served out at the great autumn manœuvres, as, according to the "Revue du Cercle Militaire," it is considered advisable to use up the stock of old ammunition before making a general distribution of the new.

In accordance with a decision of the War Minister, medical officers of the army will not in future be permitted to combine private practice with their military duty, except when they render medical services gratuitously, and they are as a rule to confine their civil practice to assisting the civil practitioners without in any case entering into competition with them. Hitherto it has been considered that medical officers, being duly qualified practitioners, were entitled to practise their profession

outside the army, and the present decision has been arrived at in consequence of the objections frequently raised by civil practitioners.

At the beginning of May an experimental mobilization of the General Staff took place. All the officers were turned out, mounted, at an early hour, and required to take part in a practical exercise. ("Revue du Cercle Militaire.")

Interesting manœuvres of the military telegraph service were recently held in the neighbourhood of Paris. In order to invest the exercises with a practical character, the telegraph troops were attached to a small body of staff officers, who represented the staff of an army composed of two army corps. A telegraph section accompanied each corps d'armée, the technical personnel being complete. The manœuvres embraced two days' march to meet a supposed enemy, one day's rest on the battle-field, and two days of march in retreat. ("Revue du Cercle Militaire.")

The great autumn manœuvres to be carried out by the IInd and IIIrd Army Corps (the latter reinforced by the 1st Cavalry Division) under General Billot in September, will, according to "La France Militaire," be conducted as far as possible under the conditions of real warfare. The opposing forces will commence operations at a distance of about 60 miles from each other, will rely entirely upon their own reconnaissances for discovering the position of their opponents, and will fight in positions to be chosen by themselves. Quarters will not be prepared beforehand. The collision will probably take place somewhere between Gisors and Beauvais. At the close of the manœuvres General Billot will combine the two forces and lead them against a marked enemy. The time and place for the final parade are not yet fixed, but the review is expected to be held on the 15th or 16th September, in the district above indicated.

The employment of clouds of smoke for concealing the positions and movements of troops and vessels in warfare is being seriously considered in France. According to "L'Avenir Militaire," interesting experiments were conducted a short time ago by torpedo-boats at Toulon. One vessel was ordered to break through a line of boats which was concealed at a distance of 400 m. by a cloud of smoke raised by the latter, and the attempt is said to have succeeded.

Germany.—Further details regarding the new liquid explosive, mentioned in the "Military Notes" last month, will be found in the "Naval Notes" of this number.

A new war school has been created at Danzig, and will commence work in October.

According to the "Revue du Cercle Militaire," a collapsible boat has been adopted for the cavalry which is sufficiently strong to admit of the formation of a bridge by which the artillery can be passed over rivers. It is said that each regiment is to receive two of these boats, each carried complete on a four-horse wagon, and that the 12 boats thus provided for a cavalry division will enable it to throw a bridge about 52 yds. long in a very short time. This bridge train of a division takes up the space of a battery, and so adds considerably to the length of a column of march, but the experiments which it is said have been already made on a large scale show that this inconvenience is more than compensated by the numerous and important services which the boats are capable of rendering. With the object of improving the instruction of the cavalry in the execution of field works, a certain number of instructors from the pioneer battalions will in future be attached to the School of Equitation at Hanover and to regiments of cavalry.

Italy.—During the first half of September field manœuvres will be held in all the army corps; the 1st Corps (Turin) and the IInd Corps (Alessandria) will have grand manœuvres. In all corps the troops will be reinforced during the manœuvres by a year's contingent of the 1st category, and, as in previous years, a division of

mobile militia will be formed by calling up several yearly classes of the 1st and 2nd categories. For the fortress and coast artillery there will be special exercises of the mobile and territorial militia. ("L'Italia Militare.")

Russia.—The "Allg. Mil.-Zeitung" states that it was originally intended to issue the new rifles, first of all, to the troops in the Warsaw district and in the other western frontier districts, but that it is now reported that the Guards are to have them this summer. It is still maintained that many of the arms, of which portions were made in France as well as in Russia, do not fulfil all the required conditions, and that many have had to be condemned. There is, therefore, little probability of the entire army being furnished with the new weapon within 3½ years, as was at first hoped.

The liability to military service, which has hitherto commenced on the 1st of January following the day on which a man completed his twentieth year, will in future date from the 1st October following the completion of the twenty-first year, the incorporation taking place between the 15th October and 15th November following. ("Revue du Cercle Militaire.")

The following particulars regarding the winter tents which have recently been tried in the Russian army are taken from the "Deutsche Heeres-Zeitung," No. 31. Experiments in bivouacking troops in tents during periods of intense cold were made in the winter of 1891–92, and these were repeated on a much larger scale in the course of last winter. In the previous trials a few men only were put under canvas with the object of merely testing their hardiness, but during the months of January and February of this year bivouacs on a large scale, each lasting for two days, were organized for the troops of the VIth Army Corps in Russian Poland, and for the Guard detachments in Warsaw. The night temperature during these exercises was as low as −13° Fahrenheit, and a strong wind was generally blowing, but the men were able to live in the so-called "Jurtenzelte," or Kamtschatka tents, without suffering seriously. The tents used in these experiments were of various sizes, accommodating from 8 to 40 men apiece. The patterns which seem to have given the best results were those of medium size, holding 15 to 18 men, and the largest size for 36 to 40 men. All the tents are constructed of pieces of canvas carried by the men themselves, the medium-sized tents requiring 11 pieces for their construction, and the largest 24 pieces. The tents for 36 men, the practicability of which has been fully established by the two years' trials, and which possess the advantage of enabling the men to sit or stand up at pleasure, besides having an endurable temperature, are pitched as follows:—The 24 pieces of canvas are sewn together, so that 8 form the roof and 16 the four sides. The roof is supported by poles at the four corners, and has an opening in the centre formed by turning back the corners of contiguous pieces of canvas. There are also four poles supporting the middle of the roof round this opening. A fire is lighted under the opening, and the men lie with their feet towards it. In the parts of the tent furthest from the fire a temperature of about 43° F. could be maintained. As a general average the external temperature varied from zero to −13° F., and the internal temperature was from 23° to 34° higher than that outside. The men were well provided with wood and straw, and cooked tea and biscuit soup, &c., with the water obtained by melting snow. During the night, medical officers visited the tents several times to see how the men were going on, and, thanks to the precautions taken, no serious cases of frost-bite occurred. The whole of the officers bivouacked in similar tents, except that there were no fires in them, but in place thereof lamps were used by which the temperature could be raised to about 52° F. Owing to the use of these tents the troops were able to carry out the manœuvres with such vigour as to demonstrate the fact that, with their assistance, they would be able to take the field even in the depth of winter. It is of course indispensable that the men should have suitable clothing, knitted underclothing, ear-laps, warm gloves, &c., but if provided with these necessaries, and plenty of wood and straw, it seems certain that neither sickness nor frost-bite need be feared.

Servia.—An interesting account of the Servian army, taken from the "Reichswehr," has been published in the "Revue du Cercle Militaire," Nos. 18, 19, and 20. The effective of the permanent army on the war footing is there given as follows:—65 battalions, 26 companies, 23 squadrons, 50 batteries, representing 60,000 rifles, 4,060 sabres, and 282 guns. The personnel is given as 2,474 officers, 102,233 men, with 26,486 horses and 15,052 oxen. The fighting strength of the national army, on paper, is put down at the following figures:—1st ban, 1,720 officers, 77,005 men, 12,305 horses, and 6,910 oxen, representing 54,700 rifles, 1,750 sabres, and 120 guns; 2nd ban, 1,506 officers, 60,712 men, 6,309 horses, and 6,000 oxen, furnishing 51,300 rifles and 790 sabres.

The three categories of the Servian army thus give a total, on paper, of 166,000 rifles, 6,600 sabres, and 402 guns.

Switzerland.—The question of ensuring a serviceable foot-covering for the infantry of the Swiss army has always been a difficulty, this part of his kit being provided by the soldier himself or his commune. In order to meet the difficulty, it is intended to provide good boots at a reduced rate. In future each recruit of the infantry and train will be entitled on joining to draw one pair of boots at the regulation price of 10 francs, and will be compelled to do so if his own boots, of which he has to provide two pairs, are not considered suitable for military purposes. Again, after 30 days' service the men will be entitled to purchase a second pair at the same rate, and, after 110 days' total service, a third pair. Special attention is to be directed to the men's stockings and socks (also provided by the men themselves), and socks are to be preferred to stockings. The men are not to be permitted to wear socks, &c., that are not considered suitable for service, and they are to be instructed in the use of foot-bandages.

In addition to the competition opened by the Military Department for a new field gun, a reward in the shape of a royalty is offered for a quadrant suitable for field guns. The details of requirements to be fulfilled are given in the "Allgemeine Militär-Zeitung" of 3rd May.

United States.—The new cavalry bit for the American cavalry is constructed in accordance with the principles laid down by Major Dwyer in his book on "Bits and Bitting," the essential feature being that the mouth-piece is to be placed exactly opposite the chin-groove, and the curb—strap or chain—must lie in the curb or chin-groove without any tendency to mount up out of it on to the sharp bones of the lower jaw.

FOREIGN PERIODICALS.

MILITARY.

Militär-Wochenblatt.—No. 39. "Russian Avowals" (extract from the "Grashdanin" foreshadowing the proper employment of the Russian cavalry on the outbreak of the next European war). "The Military Operations in 1760" (*concluded*). "Spezzia." "Pontoniers and Bridging Equipment in Roumania." No. 40. "The Endurance-ride (*Dauerritt*) of a detachment of the Russian Cavalry Officers' School" (a detailed account of the object and mode of carrying out the exercise). No. 41. "History of the War against Denmark in 1848–49 by Field Marshal Moltke." "The Endurance-ride, &c." (*concluded*). No. 42. "History of the War against Denmark" (*concluded*). "The Great Parade of Italian Troops in Honour of the German Emperor on the 24th April." No. 43.

"The Loss of Men in the Principal Battles of the last few Centuries." "Wire Guns." "The 'Jagdkommandos' of the 1st (Russian) Guard Infantry Division." No. 44. "The Loss of Men in the Principal Battles of the last few Centuries" (*concluded*). "The Firing of Field Artillery from Concealed Positions." No. 46. "Percentages of Loss" (with reference to the articles in Nos. 43 and 44). No. 47. "The Fortress of Langres and the 'Deutsche Heeres-Zeitung'" (criticism of an article in that journal). "How are Cavalry Instructional Journeys (*Übungsreisen*) most advantageously conducted?" "Musketry Exercises of the Swiss Infantry in 1893."

Neue Militärische Blätter.—May. "First Fights of the Army of the Rhine" (*concluded*). "History of the Prussian Reserve Corps" (*continued*). "The Next Invasion" (Criticism on Pamphlet, from "La France Militaire"). "What is an Offensive Fleet? Does the German Empire require and possess one?" "The Effect of the Modern Small-calibre Enveloped Bullets, as compared with that of the Earlier Projectiles of Hard and Soft Lead, considered from a Surgical Point of View." "The Value of the Standing Army, from a National-Economical Point of View." "The Lowest Admissible Limit of Bore for Small-calibre Rifles."

Jahrbücher für die Deutsche Armee und Marine. May. "The Siege of Hildesheim during the Thirty Years War, 1633—1634" (*continued*). "The Fortifications of Switzerland." "The Commercial and Strategical Importance of the Baltic and North Sea Canal." "Russia in Upper Asia and the Indo-British Military Situation." "First Aid to the Wounded in the Warfare of the Future." "Theory in Military Equitation." "The History of Fortress Warfare" (Remarks on General Müller's Work). "The Siberian Railway."

Organ der Mil.-Wiss. Vereine.—Heft 4. "The Field Gun of the Future." "The Defence of the Bridge-head at Pressburg in 1809." Heft 5. "Cavallerie vor! Eine kriegsgeschichtliche Studie. Von der Mosel zur Marne" (an instructive study of the action of the German, and incidentally of the French, cavalry, from the 17th to the 29th August, 1870; with 6 maps).

Journal des Sciences Militaires.—May. "Strategy of Marches." "Infantry Fire." "Reorganization of the Service of Intendance and Control." "Frontiers and Fortifications of the Principal Powers—Germany" (the first of a series of papers). "The Tactical Instruction of Officers" (*continued*). "The Campaign of 1814" (*continued*). "Military Instruction and Education." "The War Schools of Germany" (*continued*). "The English Campaign in the Sudan, 1884–85" (*continued*).

Revue Militaire de l'Étranger.—May. "The German War Budget for 1893-94." "The Reorganization of the Swedish Army." "The Battle and Investment of Frederica, according to the account of the Danish General Staff (with Maps)."

Spectateur Militaire.—1st May. "Le Fusil, la Cuirasse, et le Bouclier." "Le Combat de Châtillon" (a criticism of Y. K.'s "Le Combat de Châtillon, &c."). "Tactics of the Wars of the Middle Ages" (*continued*). 15th May. "Minimum Length of Service for Promotion of Officers." "Le Combat de Châtillon" (*continued*). "Tactics of the Wars of the Middle Ages" (*continued*).

Revue du Cercle Militaire.—No. 19. "The Infantry Cuirass and the Predecessors of the Tailor Dowe." "The Servian Army" (*continued*). "A Field Column in Sud-Oranais" (*continued*). No. 20. "A Field Column" (*continued*). "The Armament of Infantry, &c." (*concluded*). "The Servian Army" (*concluded*). No. 21. "The Naval Review at New York." "A Military Co-operative Society in Russia." No. 22. "The Flying Machine of Mr. Phillips." "On the Road to Lake Tchad—the last three Missions of MM. Foureau, Méry and Maistre." "A Field Column" (*concluded*). "The Italian Army and the Review at Centocelle in 1888."

Revue de Cavalerie.—May. "General Espagne." "The Superior Officers of the Cavalry." "A Dragoon of the Olden Time—Captain Jeanson." "The Cavalry at the Manœuvres of the 9th and 12th Corps in 1892" (*concluded*). "General Edelsheim-Gyulai."

Revue Militaire Suisse.—May. "Reorganization of the Spanish Army." "The New Rifles" (a general review of the state of the question).

Journal of the U.S. Cavalry Association. March. "The First (Fourth) Massachusetts Volunteer Cavalry at High Bridge, Virginia, April 6, 1865." "Cavalry upon the Field of Battle," from the Russian of Lieutenant-Colonel Prejentsoff (*continued*). "Smokeless Powder in its relation to Cavalry Efficiency." "Gaits and Gaiting of Horses." "Conversations on Cavalry," from the German of Prince Kraft zu Hohenlohe-Ingelfingen (*continued*). "Some English Views of the Mounted Action of the American Cavalry" (*à propos* of some remarks made by Lieutenant-General Sir Evelyn Wood during the discussion on Major Henderson's lecture at Aldershot on the American Civil War, and introducing an interesting and important letter from Major-General Keith Fraser, Inspector-General of British Cavalry, as to the employment of the American cavalry as cavalry proper as distinguished from mere mounted infantry). "The New Revolver." "The Cavalry Horse—His Mental and Physical Nature."

NOTICES OF BOOKS.

The Naval Annual, 1893. By Lord Brassey. London: Griffin and Co. 12*s.* 6*d.*

This is the seventh issue of this valuable work, and it will be eagerly welcomed by naval officers and all who are interested in naval matters, both English and foreign. We may say at once that the present volume is fully up to the standard of its predecessors, and, in the chapter on the British and Foreign Torpedo-boat Flotillas, an advance has been made which for the first time places it as a work of reference, in one important branch, far ahead of its hitherto successful foreign rivals, the "Almanach für die K. u. K. Kriegs-Marine," and Durassier's "Aide-Mémoire de l'Officier de Marine."

The contents of the "Annual" are divided into four parts. Part I consists of contributions from several well-known writers. Lord Brassey himself heads the list, contributing the introduction and five chapters on the following subjects:—Ships built and building; Ship-building Policy; Relative Strength; Training of Officers; and Manning. These will all be read with interest, but it is doubtful if naval officers will agree with his lordship in his views on the question of manning and the naval reserve as expressed in Chapter VI. M. Weyl, the well known writer on naval subjects and able editor of "Le Yacht," supplies in Chapter I an interesting and valuable account of the progress of foreign navies during the past year. Chapter VII, by Sir Geoffrey Phipps Hornby, on the Training of British Seamen, is of unquestionable value and will be read with interest by all connected with the navy; the gallant Admiral of the Fleet emphasizes strongly, among other suggestions, the paramount necessity of seamanship, that is, of learning how to handle a ship under sail under all conditions of wind and weather, as the only sound basis on which to found a seaman's education. On this point, we believe, a majority of officers will be found to agree with him. It is certain that French naval authorities strongly hold that opinion, while much smaller navies find it necessary to use full-rigged ships as sea-going training-ships. The chapter on Marine Engineering, by Mr. Oldknow; on Colonial Defence and Commerce Protection, by Captain Eardley-Wilmot, R.N.; and on British and Foreign Naval

Manœuvres, by Mr. Thursfield, will all well repay the reader. If anything more is required to induce naval officers to read Captain Mahan's "Influence of Sea-Power on the French Revolution and Empire," it will be be found in the interesting and clever review of those two volumes, by Mr. Dasent, in the closing chapter of Part I.

Part II consists of the usual tables and plans of British and foreign armoured and unarmoured ships, followed by the new feature in this part of the work, the tables of British and foreign torpedo-boats. Of this latter compilation we cannot speak too highly, and Mr. Laird Clowes, to whom it is due, deserves great credit, which he will undoubtedly receive, for the tiime and trouble he must have expended in collecting all the details, which are put before the readers of the Annual in so compact and useful a form. For the purpose of reference on everything connected with torpedo-boats, this chapter will prove invaluable, and we have no doubt that many Naval Intelligence Departments will avail themselves of Mr Clowes's labours, as nothing so complete on the subject has ever been published before. With regard to the tables of ships, excellent as they are, we may perhaps be allowed to point out that the similar tables in the "K. u. K. Almanach" contain a good deal of additional information in the form of notes, which might be added with advantage in future issues of the "Annual." Another feature in the similar but much smaller plates of ships in the "Almanach" might also well be adopted by the "Annual," viz., of showing on the plates the thickness of the armour, on belt, battery, turrets, &c., and the nature of the guns mounted in the different positions; were this done, the value of the plates would be much increased and they would leave nothing to be desired.

Part III contains the usual valuable chapters on armour, armour plate trials, and ordnance by Captain Orde Browne, with important tables of the ordnance of different countries, including the Q.F. guns of Elswick, Canet, and Krupp. There is also a short chapter on Smokeless Powders, by Signor E. Ristori.

Part IV is made up of the First Lord's explanatory statement to Parliament, the English and foreign Naval Estimates, and certain statistical tables, &c.

This concludes the new issue, and the editor and those who have assisted him may be congratulated on the result of their labours, which will meet with a full meed of appreciation not only from the navy but from the now numerous class outside the service who interest themselves in naval matters.

Armour and its Attack by Artillery. By Captain C. Orde Browne, late R.A., *Lecturer to the Royal Artillery College, Woolwich. London: Dulau and Co.*, 1887. Price, with Supplement, 10*s.* 6*d.*

Supplement to the above, 1893. 3*s.*

This standard work has now been brought up to date by the addition of a Supplement dealing with armour plate trials subsequent to 1887. The Supplement is arranged for use with the volume published in 1887, being paged, and having a complete index suited for binding up with it, but it is bound and sold separately when desired.

Le Livre du Bon Soldat. Exemples de patriotism appliqués à la théorie. By Captain J. Maurie and A. Basile. Paris: Baudoin, 1893. 75 c.

Attention is called to this unpretentious little work, as it may serve as a model for a book which is much needed in our own army. The French "instruction ministérielle" of 30th May, 1883, lays down that it is incumbent on officers to educate their men, and to give them such instruction in military duty as will raise their moral standard, and at the same time give them a clear notion of their professional obligations. Again, a circular of the Minister of War of 1887 prescribes that officers must exert themselves to develop in their men the fundamental principles of discipline, love of duty, and obedience to orders, and suggests that the idea of patriotism, of sacrifice for and devotion to one's country, may be evoked by the recital of instances taken from the annals of the army. The authors of this book have succeeded in compiling some 200 well-authenticated anecdotes which are admirably calculated to excite the interest of the soldier, and to impress upon him the principles above referred to.

Notes on the Charger, Military Saddles, and Sore Backs.

A Sketch on Ancient and Modern Horse-shoes and Horse-shoeing, together with a Short Description of Horse-foods and Horse-feeding. By F. Moody, M.R.C.V.S., Vet.-Lieutenant, Royal East Kent Yeomanry Cavalry.

These two little pamphlets give a good deal of interesting and useful information in a popular form. They are published by Hulatt, Bedford. The price is 6*d.* each.

Rulers of India. The Marquess of Hastings, K.G. By Major Ross-of-Bladensburg, C.B. Oxford: Clarendon Press, 1893. 2*s.* 6*d.*

This very interesting addition to the admirable series edited by Sir W. Hunter, and issued by the Clarendon Press, covers one of the most important epochs in the history of India. The administration of the Marquess of Hastings, viz., from 1813 to 1823, was marked by great internal development of the country; the finances were put in order, and the foundations of far-reaching domestic reforms were laid; but the most important work of that period was the consolidation of the Indian Empire. How this was brought about is described in Major Ross-of-Bladensburg's well-written and thoroughly readable biography.

The Farrier; or "No Foot, No Horse," with some Description of the Anatomy of the Horse's Foot and how to Shoe and Preserve it in Health. By Major A. T. Fisher. London: Bentley and Son, 1893. 2*s.*

This is a plainly written and thoroughly practical guide for the shoeing of horses and the treatment of diseases of the horse's foot.

List of Recent Foreign Books (Military).

La Guerre de Masses. 1*re Étude: Préparation stratégique des actions décisives.*

Première partie: Guerre Napoléonienne. 1890. 3 fr. 50 c.

Deuxième partie: Guerre de 1870. *Plan d'opérations français.* 1893. 2 fr. 50 c. Paris: Baudoin.

Paris, Tours, Bordeaux. Souvenirs de la Guerre de 1870—1871. By General Thoumas. Paris: Librairie Illustrée, 1892. 7 fr. 50 c.

Souvenirs de Guerre (1870—1871). By Colonel H. de Ponchalon. Paris: Lavauzelle, 1893. 306 pp. 3 fr. 50 c.

(The object of this work is to show that there were French officers in 1870 of a different type from those described by M. Emile Zola.)

Précis de quelques Campagnes Contemporaines. No. 1.—*Dans les Balkans.* By Commandant E. Bujac. 336 pp., with 19 plates. Paris: Lavauzelle, 1893. 5 fr.

Une Campagne de Huit Jours—La Guerre au Chili, 1891. By General Lamiraux. With 3 sketches. Paris: Baudoin, 1893. 1 fr.

Kollin—Austerlitz—Saint-Privat—Leuthen. Étude comparée. Par le Commandant Bonnet des Tuves. Paris: Baudoin, 1893. 1 fr. 25 c.

Le Combat de Châtillon et l'Investissement de Paris au Sud. Par Y. K. Paris: Baudoin, 1893. 2 fr.

(A defence of General Ducrot against the censures of M. Alfred Duquet.)

La Cavalerie en avant des Armées. Par un Officier Supérieur de Cavalerie. Paris: Lavauzelle, 1893. 3 fr.

Album d'Hippiatrique et d'Équitation de l'École de Cavalerie. By Captain PICARD and Dr. BOUCHARD. Paris: Baudoin, 1893. 30 fr.

This splendid work consists of 30 large photographic plates, illustrating the different types of horses, blemishes, shoeing, breaking, leaping, &c.

Les Explosifs. Par E. CORALYS. Paris: Lavauzelle, 1893. 2 fr.

Bataillon, Regiment und Brigade auf den Exerzirplatz und ihre Ausbildung für das Gefecht. With sketches. By G. Frhr. v. d. G.-R. Düsseldorf: Schrobsdorff, 1893. 2 mks. 50.

Das Gefecht der Infanterie. (Appendix to the above.) 80 pf.

Die Vertheidigung von Metz im Jahre 1870, *nebst einer Uebersicht der Operationen der französischen Rheinarmee.* By VON FIRCKS. 2nd edition. Leipsig: Lang, 1893. 6 mks.

Metz, 1870. *Kriegsgeschichtliche Studie eines alten Offiziers.* With Map. Wiesbaden: Schnegelberger, 1893. 3 mks.

(The author's design is to prove that Bazaine was not a traitor to his country.)

Die Schlacht bei Zorndorf am 25. *August,* 1758. By Dr. MAX IMMICH. Berlin: Speyer and Peters, 1893. 3 mks. 50.

Die Schlacht von Noisseville am 31. *August und* 1. *September,* 1870. By Major KUNZ. Berlin: Mittler, 3 mks.

300 *Tage im Sattel; Erlebnisse eines Sächsischen Artilleristen,* 1870–71. By F. B. WAGNER. Dresden: Köhler, 1893. 2 mks.

Kochbuch für die Truppen-Menagen. Berlin: Liebel, 1893. 2 mks.

This book contains much valuable information regarding military cookery in general, and gives a number of practical receipts for the preparation of rations in various forms.

The Universal Atlas, a New and Complete General Atlas of the World. Containing 117 pages of maps, printed in colours, and a complete index to about 125,000 names. 1 vol. London: Cassell and Co., 1893. 30*s.*

This is practically an English edition of the celebrated atlas by Andre.